

FOREWORD

“Environmental Security Planning, Prevention, and Disaster Response in the Arabian Gulf Region” was a United States Central Command (USCENTCOM) initiative, with assistance from the Office of the Deputy Under Secretary of Defense for Installations and Environment (DUSD (I&E)), the National Defense University’s Near East-South Asia Center for Strategic Studies (NESA), and the Center for Strategic Leadership (CSL) of the United States Army War College. Hosted by the Qatar Armed Forces at the Ritz-Carlton, Doha, Qatar, the conference brought together senior military leaders from the Arabian Gulf Region, international academics, governmental and military subject matter experts, and non-governmental organizations to examine critical environmental issues that affect the security of the region.

Environmental Security cooperation in the Arabian Gulf is important to U.S. strategy in the region. It complements USCENTCOM’s Cooperative Defense Initiative (CDI) activities and offers a valuable venue for regional security cooperation. This event was the second Environmental Security conference focused on the Arabian Gulf. The first, entitled “The Role of the Armed Forces in Environmental Security,” was conducted at Muscat, Oman, on April 16 and 17, 2000, and discussed a range of environmental issues that have implications for operational planning, weapons acquisitions, and military basing exercises and training in the region.

This year’s conference focused on designing a framework for a regional approach to environmental disaster prevention and response and for putting in place a long-term, sustainable process for achieving a regional capability. The Arabian Gulf region has common threats from oil spills, shipping incidents, threats from weapons of mass destruction, water shortages, and petrochemical infrastructure complexes. Natural disasters are common and are not governed by international borders. Successful solutions to resolve these issues must be multilateral and regional in nature, and must involve the host nation, national and regional economic and military authorities, non-governmental and international organizations, and the international donor community.

The conference made a valuable contribution to the security cooperation and development missions of the United States Central Command. It demonstrated the broad scope of Environmental Security issues and showed their unique value as tools to encourage cooperation within this strategically important region. Enhancing the role of the military in environmental stewardship and disaster response planning offers opportunities for the combatant commanders to interact with their regional partners and to promote regional security and stability.

Professor Douglas B. Campbell
Director
Center for Strategic Leadership
United States Army War College

EXECUTIVE SUMMARY

Environmental problems exacerbated by natural or man-made events can contribute to regional instability and conflict. Such environmental security related disasters hinder economic progress, displace populations, and facilitate the growth of undesirable elements and the proliferation of weapons of mass destruction. Failure to respond to these events in a coordinated, timely and effective manner impacts a nation's ability to govern and function. For these reasons, environmental security initiatives are key security cooperation vehicles for the United States Central Command (USCENTCOM). Over the past three years, USCENTCOM has conducted four conferences in its area of responsibility. The two Central Asia conferences established the relationships that allowed access to the bases required to fight the war against terrorism. In the Arabian Gulf region, environmental security efforts complement USCENTCOM's Cooperative Defense Initiative (CDI) activities, and offer a valuable venue for regional security cooperation.

The nations of the Arabian Gulf region have a special responsibility because the environmental security of this region is essential to the continued developmental capacity of much of the rest of the world. Successful efforts to prevent, or if necessary, to effectively respond to natural or man-made disasters in this region are of global concern. The Gulf Cooperation Council (GCC) States first addressed these responsibilities at the initial Arabian Gulf Environmental Security Conference conducted in Muscat, Oman in April 2000. This conference identified major concerns and actions perceived as likely to impact military activities in the Arabian Gulf region. Using these identified concerns as focus points, the host, Major General Hamad bin Ali Al-Attia, Chief of Staff of the Qatar Armed Forces, and USCENTCOM, with assistance from the Office of the Deputy Under Secretary of Defense for Installations and Environment (DUSD (I&E)), the National Defense University's Near East-South Asia Center for Strategic Studies (NESA), and the U.S. Army War College Center for Strategic Leadership (USAWC/CSL) conducted the second GCC-U.S. Environmental Security Conference, *Environmental Planning, Prevention And Disaster Response In The Arabian Gulf*, September 15-18, 2002 in Doha, Qatar. Attended by delegations

from Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, the United Arab Emirates, and Jordan, this event supported the pillars of the new national security strategy: strengthening alliances to defeat global terrorism, deterring WMD threats, and developing agendas for cooperative action.

Developing the Agenda for Cooperative Action

It was the goal of this Armed Forces of Qatar-hosted security cooperation conference to design a framework for a regional approach to environmental disaster prevention and response and to put in place a long-term, sustainable process for achieving a regional capability. To achieve the desired endstate, five workshops were convened to identify the specific actions required to implement the major recommendations of the April 2000 conference (Table 1), and to look in detail at managing the health and disease consequences of intentional and accidental environmental events.

In order to provide the background essential for meaningful workshop discussions, moderated panels reviewed the prior environmental security work in the Gulf, and looked at some potential risk scenarios against the threats identified by the conferees at the April 2000 Oman Environmental Security Conference. Building on this foundation, the conferees explored

**“The Role of the Armed Forces in Environmental Security”
April 16-17, 2000, Muscat, Oman**

RECOMMENDATIONS

- 1 Arrive at consensus on a unified definition of the concept of ES and it’s relevant aspects.
- 2 Intensified efforts to exchange “environmental intelligence” and “lessons-learned” from our collective U.S. and GCC experiences.
- 3 Establish a regional monitoring and warning center to notify the national centers in order to help coordinate relief efforts.
- 4 Invite civil authorities from the United States and GCC member states who are involved with the preservation of environment to future seminars.
- 5 Organization of a follow-on seminar designed specifically to address issues of technology development for Environmental Security planning and enhanced mil-to-mil collaboration in technology R&D, weapons acquisition, and table-top command-and-control exercises, and to discuss the proposals and recommendations advanced at the Environmental Security Seminar in Oman.
- 6 Develop specific programs for U.S. – GCC Environmental Security cooperation tailored to the needs of the Gulf States.

TABLE 1 – MUSCAT, OMAN APRIL 2000 CONFERENCE RECOMMENDATIONS

in detail, techniques and technologies available to assist in regional monitoring, warning, and information exchange, and the requirements for interagency and multilateral cooperation in successfully addressing disaster prevention, response, and other environmental security interests. These panels included experts from the GCC, Jordan, Turkey, the United Nations, the United Kingdom, and the United States, and directly addressed the challenges of preventing and responding to environmental disasters, including chemical, biological, radiological or nuclear events in the Arabian Gulf region.

Opening Remarks

Major General Hamad bin Ali Al-Attia, Chief of Staff, Qatar Armed Forces welcomed conference attendees and stated the importance of this conference to identify means to plan, prevent, and respond to environmental security disasters.

Brigadier General George J. Trautman III, Deputy Director, Plans and Policy, J-5, United States Central Command, stated the importance of developing a regional response to environmental security issues that are a regional problem, not one nation's. Some of the threats and crises will affect more than one state and most of them cannot be resolved by single government acting alone. He challenged the attendees to identify areas for regional cooperation on Environmental Security issues and the need to learn to plan and respond to a crisis together.

Dr. Kent Hughes Butts, Director, National Security Issues Branch, Center for Strategic Leadership, United States Army War College, addressed the importance of the role of a healthy and productive environment in maintaining regional stability. He reinforced the value of environmental security as a useful and non-threatening approach for achieving closer cooperation between the military and the civilian population, enhancing military support to civil authorities, and improving regional coordination of disaster response.

Ms. Alina Romanowski, Director, Near East-South Asia Center for Strategic Studies, addressed the role of the environment as a strategic asset from a political and economic well-being and protecting the health and vitality of the population. The strategic assets in the region—oil, gas,

water, and population—are all inter-related and underpin the stability and prosperity of the region and make Environmental Security of this region a global concern. The Center brings a broad perspective to assist in the development of a regional approach to these issues.

Mr. Curtis Bowling, Assistant Deputy Under Secretary of Defense for Safety, Occupational Health, and International Environmental Programs, provided the keynote address for the conference. He reinforced the need to address environmental issues in this region since environmental degradation can hinder economic development, displace populations, facilitate the growth of undesirable elements, and potentially the proliferation of the threat of weapons of mass destruction. He challenged the attendees to: set regional objectives; identify means of developing indication and warning of environmental disasters, detecting and tracking environmental events, and sharing relevant information; address a regional command and control for disaster prevention and response; identify regional training and exercise needs for disaster prevention and response; and identify multi-lateral processes to address the health and disease consequences of intentional or accidental events.

Security and the Environment

The initial panel, *Security and the Environment: Regional Approaches*, emphasized the direct relationship between the environmental security of the population and regional stability, promoted environmental cooperation between defense and environmental authorities, and stressed multilateral and interagency coordination opportunities. Additionally, it reinforced the conference objectives and end state through a review of the United States Central Command and Gulf Cooperation Council environmental security efforts in the region. Panel moderator Dr. Kent Hughes Butts, Director, National Security Issues Branch, U.S. Army War College, reviewed the importance of Environmental Security (ES) and its advantages to promoting national and regional security. The military has unique capabilities to address ES issues such as communications equipment, transportation assets, technical expertise, and capability to deploy quickly in response to a disaster.

For the Arabian Gulf states to benefit from Environmental Security, it is important to employ the Armed Forces to protect the environment

and conduct environmental disaster management. Colonel Nasser bin Salim Al-Tamtami, Sultan's Armed Forces of Oman provided a summary of the Oman Conference covering four main topics:

- Environmental Security from the Regional and United States Point of View
- Role of the Armed Forces in protecting the environment and environmental disaster management
- Lessons learned from disasters related to Environmental Security
- Future vision for the Gulf-US military cooperation in protecting the environment in the Region

Interagency and Regional training exercises are important to understand a state's capability to respond to a natural or manmade disaster and determine when additional assets are needed to mitigate the effects of the disaster. Brigadier General Nasser Mohammed Al-Ali, Qatar Armed Forces provided a briefing on "Interagency Training for Disaster Response Exercise" conducted September 2002. The exercise was conducted in two parts; a seminar to identify the roles and missions of the governmental organizations before, during, and after a weapons of mass destruction, and the disaster response exercise at the Al Khalifa Tennis and Squash Complex in Doha. The lessons learned from the disaster response exercise addressed the need for additional protective masks for the civilian population to prevent further contamination, a requirement for chemical detection equipment at the incident site, the need for reference books and publications to increase the knowledge and awareness of WMD, and serums and other decontaminants at the incident site for the treatment of victims prior to transport to hospitals.

Potential Risk Scenarios

The Arabian Gulf Region faces environmental challenges unlike any other region in the world. The regional environmental challenges include: water shortages, hazardous materials and waste, oil spills in the Gulf, shipping incidents, industrial accidents, desertification, environmental terrorism, weapons of mass destruction, regional earthquakes, and transmission of new diseases. Aware of this reality, the nations of the region share a common desire to move to a higher level of

environmental management. Brigadier General Hamad Ali Al-Hinzab, Advisor of Command and Staff Branch, General Headquarters, Qatar Armed Forces, moderated this panel tailored to engage the interests of environment, industry, and defense representatives on environmental management.

Many organizations view industry as a source of environmental pollution. However, industry in many cases takes enormous efforts to reduce the pollution emissions and efforts to mitigate the effects of an incident. Mr. Mohammed Jassim Al-Maslamani, Qatar Ministry of Energy and Director, Safety, Quality and the Environment, Qatar Petroleum Company, discussed the programs and efforts the company has to reduce the possibility of oil spills and efforts to mitigate the environmental damage.

Another example of an industry's efforts to counter contamination is the Qatar General Electricity and Water Corporation's (Kahramaa) water quality monitoring program. The program is focused on reducing water pollution during water production and distribution. This is an important consideration since Kahramaa uses 95% desalinated water in the production and delivery of drinking water. This is an important factor since the majority of the countries use desalination plants to produce fresh water.

Brigadier General (Doctor) Annette L. Sobel, M.D., Assistant to the Chief, United States National Guard Bureau for Weapons of Mass Destruction and Civilian Support, addressed the issue of health and disease response from a weapons of mass destruction and weapons of mass effect from a medical perspective and from a commander's perspective. These weapons impact a military's and civilian's operations from day to day activities and affect national and regional security concerns. She addressed a number of programs available for deployment to different regions to train and educate military and civilian personnel on regional disaster response and trauma system management.

Security And Environmental Planning In The 21st Century – Regional Monitoring, Warning, And Information Exchange

Mr. Trevor Hughes, Rice Hughes L.L.C., moderated the panel that explored the processes and mechanisms available to address consequence management planning at a regional level, demonstrated the quality multiplier effects of available information exchange and management tools, and identified opportunities for multi-lateral and inter-agency cooperation. Informational exchange is required to be functional, both at an internal agency level within a single country, and between regional states.

Using the State of New York's structure as an example for Arabian Gulf Cooperation, Lieutenant Colonel Randy Lambrecht, Deputy Director, Operations, Training and Readiness, New York Army National Guard spoke about the integrated federal, state response, focusing on the State of New York's National Guard response to the September 11, 2001 attack on the World Trade Center and how state emergency preparedness has since evolved in New York State.

Dr. Michael Foose, Regional Specialist for Africa and the Middle East, United States Geological Survey (USGS), provided a discussion on the USGS's efforts using remote sensing to mitigate environmental hazards. The USGS uses various types of satellites and seismometers to monitor and track potential environmental disasters. The USGS places this information in a geographic information system (GIS) to assist in monitoring and predicting the effects of a disaster. For example, the USGS, with the assistance of the United States Agency for International Development, National Oceanic and Atmospheric Administration, and 17 African countries, has developed a Famine Early Warning System used to issue warnings on potential famine areas and to focus assistance efforts to mitigate the effects.

Information sharing is critical to effective regional environmental security efforts and disaster response coordination. Ms. Jackie Hux-Cain, representing the Office of the Assistant Secretary of Defense for Installations and Environment, provided a demonstration and training for conference participants on the Defense Environmental Network Information Exchange (DENIX), which is sponsored by her office.

This web-based system is a significant resource of environmental security information.

DENIX information and tools have been made available in the Eastern Hemisphere through the Partnership for Peace Information Management System (PIMS). PIMS facilitates the 23 Partnership for Peace areas of cooperation, including civil emergency planning, crisis management, medical, and military geography among others.

Cooperation Between Defense And Other Agencies

Rear Admiral (Retired) John F. Sigler, Near East-South Asia Center for Strategic Studies, addressed two common themes on Environmental Security. Natural or manmade disasters can have a significant impact on national and regional security, and prior planning, preparation, and information sharing is critical to have an adequate response. He moderated a panel that examined the importance of prior planning, preparation and execution, and coordination between military and civil organizations.

Brigadier General Craig T. Boddington, Commander, Combined Joint Task Force-Consequence Management, Kuwait reviewed a nation's response to a disaster and the functions that may have to be performed by the host nation. The United States Central Command, a USCENTCOM initiative, created the Combined Joint Task Force to reinforce a host nation's response to a disaster. He described the Joint Task Force's capabilities, ability to reinforce the host nation, organization, equipment, and most important, the request channel for assistance.

Using the Middle East Peace Process and Middle East Regional Cooperation Program as examples, Mr. Paul Malik, Director, United States Department of State's Regional Environmental Hub in Amman, Jordan, discussed the integrated governmental and non-governmental response to promoting regional cooperative initiatives in the Middle East. These programs promote sustainable development and improve the quality of life of the citizens of the participating countries. These programs continue despite the tensions in the Middle East. He discussed the need for sustainable development through environmental stewardship

and the threat to local and national governments that may occur through environmental degradation.

Addressing national and regional cooperation, Dr. Mustafa Erdik, Chairman, Earthquake Engineering Department, Bogazici University, Istanbul, Turkey, used the Turkish disaster management system as the vehicle for discussing the integrated national and regional response to the Kocaeli Earthquake Disaster in August 1999, and how national and regional emergency preparedness has since evolved in Turkey. The events of August 1999, and the destabilizing effects of the natural disaster are major concerns and have driven Turkey to create and refine government institutions, introduction of community training, the installation of an earthquake rapid response and early warning system, and improved the military's capability to conduct search and rescue operations.

Dr. Abdul Wahab Al-Mosleh, Assistant Medical Director, Hamad Medical Corporation, closed out the discussion with a discussion of medical response to a disaster. Dr. Al-Mosleh described the principles of disaster management and the common objectives for individuals and governmental agencies involved in crisis management. He focused his presentation on the roles and actions of the medical service teams during the disaster.

Multilateral Approaches To Security Cooperation On Environmental Issues

Mr. Curtis Bowling, Assistant Deputy Under Secretary of Defense for Safety, Occupational Health and International Environmental Programs, addressed multilateral approaches to security cooperation and moderated a panel that addressed cooperation between defense and environmental authorities, identified opportunities for multi-lateral and inter-agency cooperation, explored the processes and mechanisms available to address consequence management planning, and described the practical application of information-age tools to enhance disaster response and consequence management planning.

Mr. Gary Barrett of the Office of Foreign Disaster Assistance (OFDA), United States Agency for International Development, provided a discussion of OFDA's efforts and responsibilities for the coordination

of the United States Government's non-military response to international disasters. OFDA has a key role in consequence management to provide humanitarian assistance to victims or populations affected by a weapons of mass destruction event, to provide financial and/or technical support in characterization, remediation, and guidance to host nation and U.S. mission, field personnel, non-governmental organizations, and other agencies, and to participate in interagency planning and exercises.

Mr. Pekka Haavisto, Chairman of the Afghanistan Task Force, United Nations Environment Program (UNEP), provided a discussion on UNEP's efforts on investigating the environmental impacts of conflicts, recommending strategic priorities for cleanup and remediation, strengthening the capacity of authorities for environmental management and protection, as well as catalysing and mobilising international support for environmental projects.

Mr. Khalid Al-Ali, Secretary General, Supreme Council of Environment and Natural Reserves in Qatar explained the roles and objectives, major water and air monitoring programs, and environmental tracking and assessment mechanisms of The Supreme Council for the Environment and Natural Reserves (SCENR) in maintaining the environment. The SCENR has established international links and the national point of contact to international and regional organizations and conventions on environmental issues.

Brigadier General (Doctor) Mohammed Al-Abbadi, Director, Field Medicine, Royal Jordanian Medical Service, closed out the discussion with a presentation on consequence management from a medical perspective, focusing on the management of a multiple casualty incident (MCI).

Building a Regional Capability Framework

In order to develop a regional framework for environmental disaster prevention and response, conference participants addressed critical environmental security issues in five workshops that were formed under the following charters:

- Defining Environmental Security And Setting Regional Approach Objectives

- Environmental Security Intelligence, Detection, And Information Sharing
- Regional Center/Command And Control
- Regional Training And Exercises
- Managing Health And Disease Consequences

The results of the workshop deliberations are summarized below:

Defining Environmental Security And Setting Regional Approach Objectives

An effective program requires three major actions. First, that the Environmental Committee of the Gulf Cooperation Council be a focal point for coordinating regional environmental security approaches; second, that the Gulf nations establish the foundation for a sustainable environmental security program by maintaining continuity and building capacity and expertise by developing a core group of environmental security experts both in their militaries and their civilian agencies; and, finally, that momentum is maintained by convening a GCC-US Executive Committee to set objectives and agenda for a follow-on conference.

Environmental Security Intelligence, Detection, And Information Sharing

To achieve the necessary consensus and identify existing and required organizational mechanisms for sharing information, GCC countries must conduct studies to refine and prioritize environmental threats and then establish the required network between nations to share this vital information.

Regional Environmental Center/Command And Control

The key mechanism for putting in place a long-term, sustainable process is the establishment of a regional interagency environmental response coordination center for preventing and responding to natural and manmade disasters and to share operational information. It should be the goal to obtain approval for the establishment of the regional center at the 2003 GCC Summit.

Regional Training And Exercises

Environmental events that may require a military response or military support are often key to military ops. While many skills learned in traditional military individual and unit-level training are applicable to these missions, there are also specialized skills involved that require additional training. To meet these requirements the GCC must develop regional environmental security contingency plans. With such plans in place it will be possible to identify existing capabilities and shortfalls, and then to program the additional resources, training and exercises required.

Managing Health And Disease Consequences

The nature of both manmade and naturally occurring health and disease crises is that they are transboundary. National and regional security can be significantly affected by consequences of intentional or accidental health crises. To respond to this challenge the workshop recommended including Health and Disease Consequence Management in environmental security forums, and proposed convening a Medical Surveillance Workshop in 2003 in Jordan to promote multi-lateral information exchange and network of experts applicable to medical aspects of environmental security.

Establishing a Sustainable Process: The Way Ahead

Taking the workshop products and turning them into a workable plan was the responsibility of the Executive Committee (EXCOM) made up of the heads of the participating delegations. The EXCOM's role was to develop recommendations to the GCC Armed Forces and USCENTCOM on ways to enhance environmental security planning, prevention, and disaster response in the Arabian Gulf. The EXCOM identified four necessities required to explore the conditions for a long-term, sustainable process for achieving a regional capability: effectively activate the Armed Forces of the GCC Environmental Committee resulting from the OMAN Conference; create a larger role for the GCC Secretariat General; increase military - civilian agency cooperation; and schedule follow-on activities that will generate tangible results.

To implement these actions, the EXCOM agreed to conduct a third conference, ESC III, within 18 months. Guidance on the processes and substance of the conference will be provided by the EXCOM, which will meet at least two times prior to the event. The first meeting of the EXCOM will occur in 2003 and include presentations on the GCC Secretariat's and each country's interagency approach to environmental disaster response. The EXCOM agreed on the necessity of establishing a Regional Environmental Security Center based upon a well-defined charter. The Center will establish procedures for a broad GCC response to any regional environmental crisis, leverage the Eagle Resolve/CDI Coordination Center, and reflect common terms of reference and the approval of national leadership.

Future Plans

At the conclusion of the conference, General Tommy R. Franks, Commander, United States Central Command, challenged the attendees to resolve how to use the Executive Committee to its maximum ability and to determine if the Gulf Region wants to establish a Regional Coordination Center to manage and think about environmental issues in the years ahead.

Major General Hamad bin Ali Al-Attia, Chief of Staff, Qatar Armed Forces, emphasized that the responsibility for protecting the environment is not limited to one group or one authority, but is the responsibility of all individuals in every society. He stressed that we are all required to make the extra effort, to find the most suitable method, and to adopt the rules and regulations that help make this task easier. Finding these methods will come only through working, holding seminars and conferences, and exchanging expertise. This expertise should then be developed practically by establishing joint centers that take care of the environment. He closed by accepting that the opinions expressed during the conference deserved the greatest attention from the regional representatives, who need to take them seriously and implement them.

Meeting participants agreed to hold another regional Environmental Security Conference in 18-24 months. The country host and location remains to be determined.



CHAPTER I

WELCOMING REMARKS AND KEYNOTE ADDRESS

Introduction

Brigadier General Hamad Ali Al-Hinzab, Advisor of the Command and Staff Branch, General Headquarters, Qatar Armed Forces, welcomed the attendees and participants to the Second Environmental Security Conference for the Arabian Gulf. He thanked the participants from the Gulf Cooperation Council (GCC) countries, and friends and allies from the United States Central Command, the Office of the U.S. Secretary of Defense for Environment and Installations, the National Defense College, the Near East-South Asia Center for Strategic Studies, and the U. S. Army War College. He then introduced the Conference Host, His Excellency, Major General Hamad bin Ali Al-Attia, Chief of Staff, Qatar Armed Forces.

Welcoming Remarks

Major General Hamad bin Ali Al-Attia
Chief of Staff, Qatar Armed Forces

In the name of God, the Merciful, the Beneficent, *“Do not lay ruin to the land after it has been made well.”* {Qur’an}

Your Excellencies the leaders, dear guests, peace be upon you. I would like to welcome you here in your second country, Qatar. Thank you for accepting our invitation to attend this Environmental Security Conference. I would like to especially thank our friends in the United States Central Command and the Near East-South Asia Center for Strategic Studies (NESAS) for their role in planning and preparing this conference.

This conference is a continuation of the Gulf Cooperation Council (GCC) Environmental Security Conference conducted April 2000 in Oman. The conference in Oman shed light on numerous issues related

to Environmental Security and the general role of the armed forces in environmental protection, planning, and cooperation with respect to environmental disaster management.

The importance of this conference lies in the environmental changes throughout the world and the consequences of these changes such as flooding and pollution. The State of Qatar is very eager to have a role in helping solve the environmental problems of the world. This conference is our small token of this concern. Our leaders believe in improving the environmental situation locally and regionally. Therefore, this conference was titled, “Environmental Security Planning, Prevention, and Disaster Response in the Arabian Gulf Region”. The title expresses the aims that we are trying to achieve during this conference.

The State of Qatar has always realized the importance of maintaining the environment; therefore it established the Permanent Committee for Environment Protection in 1981. In 1994, it became the Administration of Environment with significant basic laws, rules and regulations. This Administration worked under the Ministry of Municipalities, but the vision of His Highness the Prince was for something bigger than just an administration. Consequently, in 2000, the High Council for Environmental Protection was formed, headed by His Highness the Crown Prince. This council was given full authority and total independence from all other government departments. This council was equipped with the best of expertise, skills and equipment. Several of the most significant aims of the council are: raising public awareness and educating all segments of society about the problems of the environment; implementing the principles and concepts of sustainable development, building up human and technical resources for the Higher Council for Environment; and protecting and developing the natural life in Qatar.

The State of Qatar has encouraged and provided scientists and researchers with every possible means to conduct studies that contribute to developing the concept of Environmental Security at all levels. The State has allocated prizes for studies and distinguished research in this field. In my hand, you can see a book with the title, “Environmental Problems from an Islamic Perspective”. The book published by the Library of Research and Studies at the Ministry of Religious Trusts

(Awqaf) and Islamic Affairs has received a prize from the Library of the Late Sheikh Ali bin Abdullah Al-Thani.

The State of Qatar has always been eager to take part in seminars, meetings, and conferences about Environmental Security because of their significant role in developing the concepts of environmental preservation locally and regionally.

Dear Guests, I would like to thank you and thank every one again who participated in preparations for this conference and contributed to its success. I wish you all the best.

Welcoming Remarks

Brigadier General George J. Trautman III
Deputy Director, Plans and Policy, J-5,
United States Central Command

On behalf of the Commander in Chief of the United States Central Command, let me welcome you all to this conference.

We all owe a special thanks to General Al-Attia, Chief of Staff, Qatar Armed Forces and to the Qatar Armed Forces for hosting this conference. Thank you, Sir.

The collective wisdom and technical expertise of the delegates sent here by the nations of the Gulf Cooperation Council and Jordan is very impressive. Your contributions over the next three days will prove very important to furthering the cause of Environmental Security in the region.

We are honored to have with us, Mr. Curtis Bowling, Assistant Deputy Under Secretary of Defense for Safety, Occupational Health, and International Environmental Programs, who will provide our conference keynote address.

There are two organizations without whose help Central Command and the Qatar Armed Forces could have been as well prepared as we are today. The Near East-South Asia Center for Strategic Studies (NESAC) and the Center for Strategic Leadership of the United States Army War

College have done most of the preparation work before coming here. We will all be the beneficiaries of their efforts. We also owe thanks to Ambassador Quinn and the U.S. Embassy team for their invaluable guidance and advice.

Two years ago, Oman and United States Central Command sponsored a successful Environmental Security conference in concert with Gulf Cooperation Council states. During that conference, we learned that, to ensure a comprehensive approach to the problem, relevant civil authorities must be included when we conduct military-to-military talks on Environmental Security. So I am pleased to see key civilians here today that will make important contributions to our upcoming discussions.

I particularly hope that the civilian authorities will help us identify ways to enhance ties between the military and civilian agencies such as the Environmental Protection Agency, the Federal Emergency Management Agency and their counterparts in the GCC countries. If we can improve interagency communications, we have a much better chance to be effective and responsive in the face of an unexpected environmental crisis.

Clearly, Environmental Security is a regional problem and requires a regional response. Environmental Security can encompass a wide range of issues, from water scarcity to major disaster, either man-made or natural. Some of these crises will affect more than one state, and most of them cannot be resolved by a single government acting alone.

If we can develop a clear understanding of the term “Environmental Security” and the issues that surround it, I think we will be better able to define the military’s appropriate role in assisting our nations in combating whatever may occur. There are several ways that the military can enhance Environmental Security. One is by being good stewards of the environment. We should avoid behavior such as dumping environmentally damaging material into the oceans or onto the land that would contribute to environmental disaster. We are uniquely suited to assist our governments in making a rapid response to either man-made or natural disasters that may occur in the environment. We have the command and control, the mobility, the discipline, and the manpower

to react when our nations need our help the most in response to an environmental crisis. If we work together, we can be poised to provide that support when it is needed.

We have all learned to work together in completing our military tasks. The best approach to Environmental Security is often to take a fully integrated, multinational and synergistic approach to Environmental Security problems. We must begin to think about how best to respond together, rather than individually, to a broad range of potential regional environmental catastrophes.

As a starting point, we will hear about earlier environmental disasters and the resulting need for close cooperation among responding agencies. We will learn how armed forces in other states have executed environmental stewardship missions appropriately.

I would leave you with one thought this morning. We must identify areas for regional cooperation on Environmental Security issues, and we need to learn to plan and respond to crisis together. In short, we are stronger united than we are apart with regards to dealing with environmental crises.

I am certain this conference will be a success, and I look forward to sharing ideas with each of you this week and in the future as we tackle these issues directly.

Welcoming Remarks and Setting the Azimuth

Dr. Kent Hughes Butts
Director, National Security Issues Branch,
Center for Strategic Leadership
United States Army War College

On behalf of the Commandant of the Army War College, Major General Robert Ivany, and my colleagues from the Army War College, I would like to state our appreciation for the opportunity to cosponsor this valuable Environmental Security conference and to support the regional objectives of the United States Central Command and the Department of Defense. In particular, I would like to offer our thanks to the Qatar

Armed Forces Headquarters staff, and our good friends at the NESAC Center; the Office of the Under Secretary of Defense for Installations and Environment, the leadership of the Central Command, and most especially, we would like to thank Major General Hamad Al-Attia for his excellent support and guidance in the preparation of this conference. I would also like to recognize our friends and colleagues from the Environmental Security community, who have joined us from around the globe, and the governments of the GCC states and Jordan, who have generously made their delegations available to contribute to these discussions. We have been looking forward to this year's conference, not just because it allows us to renew our efforts to address common environmental problems, but because it offers us the opportunity to gain a regional perspective on Environmental Security from our Gulf Cooperation Council colleagues.

Over the last decade, the International Fellows at the United States Army War College have war-gamed Environmental Security problems and have reiterated time and again the power of Environmental Security for preserving regional stability and national security. We have sought their guidance as we have undertaken workshops, conferences, and exercises with regional militaries around the globe, and we have incorporated Environmental Security into the Professional Military Education of our officers, noncommissioned officers, and enlisted men and women. We have seen, in regions where Environmental Security has been institutionalized, that countries are significantly better prepared to respond to the consequences of environmental disasters and to reduce the threats of environmental issues to national and regional security. Legal and educational guidelines make environmental compliance and disaster response cultural fundamentals. U.S. soldiers will now place an oil pan under their vehicle to collect spilled oil that might otherwise damage watersheds and valuable drinking water supplies. Recognizing the role of environmental degradation in promoting insurgency, the Armed Forces of the Philippines are now reconstituting the rain forests in Mindanao. In Central America, the militaries of all seven countries have joined in the Mesoamerican Biological Corridor Project, undergoing extensive environmental training and education programs that have enabled them to support their governments' Hurricane Mitch recovery efforts and prepare to undertake multilateral disaster response activities. Institutionalizing security of the environment encourages the synergy necessary to meet environmental challenges.

Environmental threats have the potential to rob the people of the region of their health, their agricultural land, the fresh water resources necessary to sustain their countries' economy, and, in turn, the stability of the region. As they have with other defense threats, our militaries have an important role to play in fighting the environmental enemy. By undertaking this mission, the military brings unique skills to the fight. They provide essential support to civil authority, which is usually technically expert, but lacking in manpower, transportation and critical resources. But perhaps more importantly, the Environmental Security mission is an opportunity for the military to demonstrate to the people that their government and the military care for their welfare.

Environmental Security is a powerful tool of governmental legitimacy, and it has enhanced the cooperation between our militaries. The Preventive Defense Strategy of former Secretary of Defense Perry underpins much of the overseas activities of our military in the last decade. We recognize that we need to promote understanding, trust, and stability to prevent the conditions for conflict and to build the conditions for peace. This approach allows the military to shape the security environment, to be prepared for natural and man-made environmental disasters and other issues that threaten regional stability, and to be able to respond to these in cooperation with other militaries. This idea is the basis for the current security cooperation strategies that have been crafted by our regional combatant commanders and support our national security strategy objectives.

National interests turn on regional stability. Environmental issues, such as resource access and quality and consequence management, are now recognized as major variables in regional instability and conflict, exacerbating tensions from resulting religious, ethnic, and other local differences, such as socio-economic disparities between rural and urban areas, rapid economic development, and border disputes. However, environmental issues may also promote regional stability as confidence building measures, creating opportunities for communication and cooperation between regional states that might in other ways be antagonists. Simply put, environmental issues, left untended, can undermine governments and destabilize regimes. Yet these same issues offer a reason for militaries to work together to support civil authority,

and to demonstrate the legitimacy of government and promote military cooperation.

I appreciate the opportunity to speak with you this morning about this topic. We have many other opportunities and excellent speakers who will be here this week. Please use this opportunity to seek out subject matter experts that are here, and ask them for their ideas on how we may best work together in a multilateral fashion to address these common environmental problems.

Welcome and Introduction of Keynote Speaker

Ms. Alina Romanowski

Director,

Near East-South Asia Center for Strategic Studies

It is a privilege for me to address this important group of experts and fellow colleagues in the region. I would like to start by setting a framework.

There are many different perspectives from which one can look at Environmental Security. The economic perspective sees the problem as one of saving and managing the use of vital resources. The conservation-oriented view defines the problem in terms of protecting the environment and leads to limiting the use of natural resources. The health and public services perspective focuses on the problems of responding to diseases and other natural and man-made humanitarian emergencies, and the prevention and treatment of communicable diseases.

Let me speak to you from the perspective of a Center for Strategic Studies, where we see the environment as a strategic asset. In this context, the environment of the Gulf region is of special interest. Why?

First, the political and economic well-being of this region is dependent on the efficient development, management, and protection of its natural resources, primarily oil, gas, and water. These same resources, particularly oil and gas, are vital to the future growth and development of regions far removed from here: the Americas, Europe, China, Japan, and Africa, in fact all around the globe.

Water, a regional critical shortage, has always been viewed as a source for potential tension and conflict. The Gulf War illustrated that our ability to produce fresh water can be put at risk, and protecting this resource has involved the international community.

Recently, the United States was asked to assist in reducing tensions between Lebanon and Israel, not over Hizballah or the Palestinian issue, but over the allocation of water from the Hasbani River for irrigation.

Let us not forget people, a strategic asset for any nation. Protecting the health and vitality of the population in the face of rapid population growth, and new and more powerful diseases spread through the increasingly integrated global society, is critical.

These strategic assets—oil, gas, water, and population—are all interrelated and underpin the stability and prosperity of this region and make the Environmental Security of this region a global concern, not just a local or regional concern.

Often, no one country is responsible for environmental problems. Many nations have contributed to their causes, and many of these issues are trans-boundary, that is, they do not respect man-made boundaries.

Countries around the world are facing complex and interrelated environmental challenges that they cannot solve individually. Governments are judged on whether they can provide clean air and water, safe energy, and food to their people.

Many environmental problems can only be addressed effectively if nations of the world work together in adopting and implementing result-oriented policies. It is in our national interests to ensure that our neighbors and the international community take steps to prevent or mitigate the potential harmful effects associated with environmental problems. There are many ways, using diplomatic efforts and working bilaterally and regionally with key allies, that these problems can be overcome.

With an increasingly integrated world, more and more governments will be brought together to sign on to key ideas on how this world should operate for our mutual benefit. Nations will be asked to come together

to build cooperative frameworks and, where appropriate, institutions that reinforce and sustain them even more.

It is not a coincidence that the NESACenter is involved in sponsoring this conference. The Center is uniquely positioned to explore solutions to regional problems from a regional perspective. The NESACenter was founded to promote broad regional understanding of strategic issues critical to the long-term security and stability of this region. Our mission is also to nurture regional cooperation in seeking solutions to these issues.

We, along with the United States Army War College and other Department of Defense educational institutions have long recognized the importance of the environment as a subject to be included in national security and strategic studies, and in the professional military education of our officers as well as our civilians.

The Center includes Environmental Security issues in its curriculum not only because it is vital to any nation's economic development and security, but also as a basis for promoting regional cooperation and integration.

We believe the Center can also bring an even broader perspective to developing a regional approach to these issues. The Center's focus stretches far beyond the GCC countries, to include Morocco and even Bangladesh. Many, at first blush have said to us, "What do all these nations have in common?" It is clear from discussions in our seminars that many of the environmental issues we will address in this conference are not unique to the GCC region.

We have already asked participants from our previous seminars to help think about new, innovative regional approaches to such problems as Environmental Security. These participants have recognized that, in the face of environmental disasters, many things are possible, and they understand that advanced planning, coordination, and cooperation among government entities, as well as other nations, are critical to managing a disaster. Equally important is the need to manage information, to reassure one's people that the disaster can be contained and, in fact, overcome.

As an active player in this conference, we expect that this conference will contribute significantly to helping this region develop better mechanisms to respond to and prevent environmental crises and to help us be more effective as custodians of the region's vital resources.

Now let me introduce our keynote speaker, Mr. Curtis Bowling, Assistant Deputy Under Secretary of Defense for Installations and Environment, from the Office of the Secretary of Defense.

Mr. Bowling is a well-known expert on how governments need to manage their nation's environment. Mr. Bowling, with twenty-eight years of government service, has developed a broad experience in national and international environmental safety and health programs while serving in various positions in the Office of the Secretary of Defense, the United States Air Force, and the Army Corps of Engineers.

Most importantly, he is the person in the Department of Defense who is responsible for developing and implementing policies on military matters relating to Environmental Security.

In his current position as Assistant Deputy Under Secretary for Safety, Occupational Health and International Environmental Programs, he is responsible for defense worldwide safety, occupational health, fire and emergency services, international environmental management, and international defense environmental cooperation. We are very privileged to have Mr. Bowling here with us to share his broad experience.

Keynote Address

Mr. Curtis Bowling
Principal Assistant Deputy Under Secretary of Defense for Installations
and Environment

I wish to welcome you and to thank the Qatar Armed Forces for hosting this important conference. They have provided a superb venue with excellent support and wonderful hospitality, and I thank you.

We value this opportunity to promote the understanding of each other's views and priorities, and as you noted from my introduction, the reason I have such a passion for environmental issues is that I am, by

training, an engineer, an environmental and civil engineer, and for the last twenty-eight years, I have had the opportunity of working with all of our services in the U.S. Department of Defense, and trying to build effective and more efficient environmental programs. I think one of the things we have learned is that it takes teamwork, and I think the team we have in this room today will help us look at regional issues and hopefully find creative solutions.

As Brigadier General Trautman stated, the U.S. team, led by United States Central Command, with the assistance of Ambassador Quinn's folks, my office, the United States Army War College, and NESAs have developed an agenda that directly addresses the challenges of preventing and responding to natural or man-made environmental disasters in the Arabian Gulf. This is part of our ongoing effort to address Environmental Security issues around the world. Our partnership with the GCC started just a few years ago, but it may interest you to know that we have experienced similar successful working relationships with other organizations and regions in the world as well, starting with NATO in the mid-1980s, and most recently with a South American regional Environmental Security conference held in May 2002. I know some of our Gulf partners have held conferences this year that touched on these important environmental issues, and I look forward to learning more about them during Panel Two today.

As the world has seen, environmental problems can be exacerbated by natural or man-made events that contribute to regional instability and conflict. Failure to respond to these events in a coordinated, timely, and efficient manner can impact a government's ability to govern and to function. I think we have seen some of that with events in South and Central America.

Environmental degradation from these disasters can also hinder economic development, displace populations, facilitate the growth of undesirable elements, and, potentially, increase proliferation of the threat of weapons of mass destruction. We must address key environmental issues in this region.

Most importantly, we must ensure procedures are in place to deal with the prevention of disruptive environmental events. Key focus areas

should be water resource protection and competition, air and water pollution resulting from accidental or intentional oil or chemical spills and fires, and the means to identify and contain regional infectious diseases, including those that might result from the use of weapons of mass destruction.

What is our goal this week? This conference, hopefully, will provide a framework for a regional approach to environmental disaster prevention and response and put in place a long-term sustainable process for achieving the regional capability to deal with these disasters. Combining and leveraging our resources and knowledge will enable all of us to prevent disasters and to respond efficiently when the need arises. This is the goal we seek to accomplish over the next three days. By the conclusion of this conference, we should make a commitment to the following goals:

1. Set regional objectives;
2. Identify means of:
 - a. Developing indication and warning of environmental disasters,
 - b. Detecting and tracking environmental events, and
 - c. Sharing relevant information;
3. Address a regional command and control for disaster prevention and response;
4. Identify regional training and exercise needs for disaster prevention and response; and
5. Identify multilateral processes to address the health and disease consequences of intentional or accidental events.

How can we accomplish these goals? The workshops on Wednesday are critical for the overall success of this conference. In order to provide the background that is essential for these workshops, we intend to use a series of panels today and tomorrow to first review the prior Environmental Security work in the Gulf and then to look at the potential risk and threats identified in the April 2000 conference in Oman. We will also discuss

techniques and technologies to assist us in environmental planning. Using these introductory panels as a foundation, we will then explore in detail regional monitoring, warning and information exchange, and the requirements for interagency and multilateral cooperation in successfully addressing these security interests.

I would like to see this conference result in action. This audience has a special responsibility, beyond the local and regional benefits of Environmental Security, because the Environmental Security of this region is essential to the continued developmental capacity of much of the rest of the world. The GCC's successful efforts to prevent, and if necessary, to effectively respond to natural or man-made disasters, is a global concern.

The former U.S. Combatant Commander of Central Command said at the last GCC Environmental Security conference: "The seminar and future discussions on Environmental Security will benefit the entire region and the world." He went on to say, "The continued friendship and cooperation of the U.S. and the GCC militaries in important endeavors like this will have a profound effect on regional stability." I think his words still hold true today. We have a tough task ahead of us. I look forward to our cooperation over the next few days.

CHAPTER II

SECURITY AND THE ENVIRONMENT: REGIONAL APPROACHES

Introduction

Moderated by Dr. Kent Hughes Butts, Director, National Security Issues Branch, Center for Strategic Leadership, United States Army War College, the panel emphasized the direct relationship between the Environmental Security of the population and regional stability, promoted environmental cooperation between defense and environmental authorities, and stressed multilateral and interagency coordination opportunities. Additionally, it reinforced the conference objectives and end state through a review of the United States Central Command and Gulf Cooperation Council's Environmental Security efforts in the region.

Opening Remarks

Dr. Kent Hughes Butts
Director, National Security Issues Branch,
Center for Strategic Leadership
United States Army War College

Environmental Security is a topic with which many are familiar. Yet, it remains a new and often misunderstood role for the military.

Frequently people will ask, "Are all environmental issues security issues?" The answer is "No." Many environmental issues are not relevant to national or regional security interests. Those which relate to stability and conflict, or which may be used as confidence-building measures for a region or for a nation, are definitely security-related. When the United States pursues its national security strategy, it identifies its security interests. Any environmental issues that affect those interests positively or negatively are considered to be security issues, and variables such as the military, economic, or diplomatic elements of power, are directed

toward promoting those security interests and dealing effectively with those environmental issues.

Environmental Security is often associated with conflict: the conflict that may result or be triggered because states or groups are competing for scarce resources; or the tensions that result when pollution from one country spills into another; or conflict that is causing problems in the country that receives an influx of refugees due to a migration resulting from an environmental event. However, Environmental Security may also present an opportunity to promote confidence-building and communication between countries that may either be in conflict or in other ways have no reason to be working together.

Environmental Security advantages have proven themselves over the years, and they demonstrate why the environment is an important element of security. Environmental Security has been used as a medium for reaching out and communicating with countries all around the world. It is nonthreatening, it transcends tensions, it affects all countries, it is an appropriate military role, it is generally low cost, and it promotes international and interagency cooperation. All of these are critical elements for the military these days.

Environmental Security issues are often regional and transnational in scope. They do not respect borders. Disease, floods, and the effects of nuclear, biological, and chemical (NBC) weapons do not stop at borders. As a result, they require a multilateral response. An important objective of this conference is to identify both how to respond to these Environmental Security events and how we need to work with one another to do so.

The military has a particular advantage in addressing Environmental Security issues. They have good communications. This is why the United States military element of power has been called upon to address these over the years and why the U.S. Central Command (USCENTCOM) is working closely with many of the Gulf Cooperation Council (GCC) states to prepare for disasters. How many times have you worked with your civilian counterparts and found that they needed your short- or long-wave communication capabilities to reach their headquarters during a civil emergency? The military is also present on the frontiers, by necessity.

When the government needs to deal with problems in a distant area, whom could they call on, except for the military? The best transportation assets are usually required for the military, so that it is able to defend borders and travel the full length of the country. Technical expertise is resident in construction engineer battalions and other areas within the military. The military security mission is already defined, and the military has a well-accepted role in crises response. These are all valid reasons why the military should be involved in dealing with Environmental Security issues, prepared to manage the consequences of various forms of disaster events, and that is why we are participating here today.

A critical role for the military is participating in disaster response. However, doing so takes the military out of its very comfortable defense role and requires working with other militaries. Also, the military must work with the civilian government to receive direction, to seek advice on how to handle a disaster, and to determine how the environmental ministries, transportation ministries, and emergency management ministries want their objectives and missions to be supported by the military. The United States military has struggled for many years to communicate with their civilian counterparts. In fact, this is not a phenomenon restricted to the United States. The World Bank Environmental organization asked us to come to Washington to discuss environmental matters at one time. They said, "Our problem is that we do not know how to communicate with the military. If we have a failed state, we often have a disaster, typically an environmental disaster that has undermined the government and caused it to fail. The military is brought in and preserves law and order. But we do not know how to work with them to help them establish the infrastructure in that country so that, when they hand off to a civilian government, it is successful. We do not know how to communicate across that military cultural barrier." In our own Department of Defense and Department of State, we oftentimes joke with one another. Our Department of State rarely brings slides to a presentation. Our military always brings slides to a presentation. Ask the Department of State if they think the military can speak without slides. They will joke and say, "No." So, even in a culture that has promoted interagency cooperation on difficult international issues for years, we have different cultural norms, and so the military must prepare to work with the other agencies. Moreover, and perhaps more difficult and definitely equally important, when a disaster occurs the military must work with non-governmental

organizations, other countries, the donor community, and multilateral organizations. It is almost impossible to resolve a disaster without working with these groups. Other countries will be involved. They have priorities. How does their military go about its mission? What about the civilian agencies in that country? What about the relief organizations? Is the military prepared to deal with them? The U.S. military paid very little attention to relief organizations, non-governmental organizations (NGO), until we moved into Somalia to deliver relief aid in the early nineties. We found that the port of Mogadishu was managed by CARE, and managed very well. The stevedores responded to the leadership of the non-governmental organizations, and would only respond to our military if the NGOs were supporting. We needed the support of the NGOs to get the food aid to the regions that required it. We learned to value NGO participation. But they speak a different language. They have a different culture. It takes preparation ahead of time to ensure that the resources that are required to successfully respond to and mitigate a disaster are in place.

Many diverse events qualify as Environmental Security issues. The military must be prepared to address natural disasters, technological disasters, the employment of nuclear, biological or chemical weapons or the distribution of radioactive material, pollution problems (air and water), and public health—epidemics and drug resistant strains of diseases. These are all difficult problems with which our military communities must now deal.

Environmental degradation, a common problem in all of our regions, and resource conflict are issues that the military must be prepared to address, if they occur; in preparation for dealing with them, we may also promote communication and cooperation between the regions militaries, NGOs, other countries, donor organizations, and civil authority.

Consequence management is a particularly important element of Environmental Security because of the technical and political responsibilities involved. It encompasses a variety of difficult tasks that the military must execute: transport, communications, engineering, information sharing, planning, health and medical services, hazardous material management, and the legal aspects of all of these. During the

course of our conference, we will address many of these issues and their importance and how to successfully manage them.

This conference presents us all with the opportunity to better understand Environmental Security issues and to establish the working relationships necessary to make the militaries of the region effective when addressing these issues.

Report on Results of April 2000 Conference

Staff Colonel Nasser bin Salim Al Tamtami
Director of Operations, Oman Armed Forces Chief of Staff
Sultan's Armed Forces of Oman

Dear Leaders, Officers and ladies and gentlemen, peace be upon you. Let me introduce myself, I am Colonel Nasser bin Salem Al Tamtami, head of delegation of the Sultanate of Oman, for the Armed Forces of the Sultan, to this conference. I will discuss and brief the results of the First Environmental Security Seminar for the Gulf Cooperation Council (GCC) countries conducted in Muscat from 16 to 17 April 2000, which focused on the role of the Armed Forces in protecting the environment and combating and managing environmental disasters. This presentation will provide an introduction, the objectives of the seminar, and a summary of the main topics discussed during the conference. The conference addressed four main areas: Environmental Security from the regional and the American point of view, the role of the armed forces in protecting the environment and environmental disaster management, the lessons learned from disasters related to Environmental Security, and a futuristic vision for Gulf-US military cooperation in protecting the environment in the region. I will outline the many achievements of the Armed Forces in the GCC countries, i.e., what was achieved after the conference and the role of the Sultan's Armed Forces. Finally, I will make a few concluding remarks.

Allow me to start my presentation with this special quote about the environment, from the Chief Commander of the Armed Forces:

Protecting the environment is a collective responsibility that does not stop at the political borders of the state. Therefore every human being wherever he is has a duty to contributing to the protection of the environment and to dealing with it wisely. Every one has to be aware of the many causes of the pollution, whether natural, biological, industrial, chemical or physical. Many nations must attempt to control random population increase and limit the effects of desertification and drought on whatever pastures and water resources they have left. We also urge the industrial world to limit their race for technology and to narrow the big gap in the world economy between the industrial world and the developing world,

in order to find the right balance between the desired development and the protection of a clean environment.

Those words were said during the International Conference for Development and the Environment in Brazil.

The environment today faces many great dangers that threaten it and its natural resources. This threat could be caused by man-made or natural causes. These environmental dangers affect all members of society, the military as well as the civilians. These dangers do not stop at a nation's border but may cross over borders without any restrictions. Therefore, the armed forces and various security administrations realized the seriousness of these dangers, their impact on society, and on security in particular. The armed forces and the security departments have expended tremendous effort and resources to confront these dangers by adopting military environmental strategies that correspond to their respective responsibilities.

The First Environmental Security Seminar, held in April 2000 in the Sultanate of Oman, focused on the importance of clarifying the roles of the armed forces and the various security departments in maintaining Environmental Security. The conference was conducted with the active participation of the armed forces in the GCC countries and the cooperation of the United States Central Command (USCENTCOM).

The aim of this summary is to enable the sponsors of this conference to link the previous results with the activities of this conference. As I mentioned before, the seminar of 2000 focused on four main areas. The first area was "Environmental Security: Regional and U.S. Perspectives." Environmental dangers today are too many to list. Nevertheless, everybody agrees that these dangers confront military planners with new, unexpected tasks, and they demand the formulation of new plans. The consequences for the environment might endanger national and regional economies, which would have an impact on security in general. These dangers could become new sources of internal and external conflicts, conflicts that would require military intervention to deal with. Environmental threats could result from natural or man-made disasters, or from shipping methods that are beyond the control of the responsible civil authorities.

Therefore, we have to study these environmental dangers and take them into consideration in order to find solutions and prepare plans to deal with the consequences before they take place. This is what is meant by Environmental Security. I believe that we are all serious in finding a common definition for the concept of Environmental Security and in activating the military to carry out their responsibilities adequately.

The second topic was the role of the armed forces in protecting the environment and in disaster management. In this session, two subjects were addressed: the everyday practices of the armed forces and the different security administrations.

The first sub-topic was the practices of the armed forces and security authorities and their role in environmental pollution. The armed forces do many things, inside or outside of their bases, which might harm the environment. This could be as a result of not abiding by the rules and regulations for environmental protection, not following the necessary standards for the protection of the environment, and/or complete disregard for correct planning for sustained development. During the previous conference, everybody focused on the necessity of protecting the environment inside the camps and military bases. This requires abiding by the environmental rules and regulations and standards when carrying out any project. It also requires proper planning for the available natural resources, in line with the responsibilities of the armed forces. This might require a request for coordination with civil authorities, especially those concerned with environmental protection, and for the establishment of environmental communication channels between the armed forces and these civil authorities. Commanders need to increase awareness of all environmental aspects at all levels in order to achieve the required goal, which is a safe environment for everybody and the protection of resources.

I should mention the importance of having an organization that oversees environmental matters in the armed forces, that is, an organization responsible for studying and monitoring environmental problems, finding suitable solutions, and supplying all the necessary financial and human resources. The second sub-topic was the daily practices of the armed forces and security authorities that would limit the impact of pollution. The armed forces can actively contribute in limiting the effects of pollution,

whether due to natural or man-made disasters. Armed forces have airplanes, ships, heavy equipment, expertise, and human resources that can play an important role in disaster response and prevention. Intelligence information available to the armed forces enables them to provide early warning of various polluting operations. Early warning limits the harmful results. This was the origin for creating regional and international communication channels to facilitate environmental intelligence and information exchange among the states, in order to activate environment protection operations.

The third area was the lessons learned from the disasters related to Environmental Security. Various national disasters related to security were discussed, including the principles for managing water pollution, the Exxon-Valdez accident, the sinking of the oil tanker Al-Jaziah and its effects on desalination plants, and finally the oil well fires from Operation DESERT STORM.

The fourth area was the futuristic vision for US-Gulf cooperation to protect the environment in the region. This section focused on the future perspectives of the previous three areas of discussion. The sponsors of the conference developed numerous recommendations:

- * Develop a common definition of Environmental Security and its relevant aspects in order to avoid any misunderstanding in the future;
- * Create an intelligence cell for Environmental Security and establishing information centers;
- * Establish a regional monitoring and warning center to notify the national centers in order to help coordinate relief efforts;
- * Organize a follow-on seminar to address issues of technology development for Environmental Security planning and enhanced military to military collaboration in technology research and development, weapons acquisition, and table-top command and control exercises, and to discuss the proposals and recommendations advanced at the Environmental Security Seminar in Oman;

- * Invite civilian authorities with specialized environmental expertise from the United States and Gulf Cooperation Council member states to future seminars.

With respect to the United States, the suggestion was made that specific programs for United States–Gulf Cooperation Council Environmental Security cooperation could be developed and tailored to the needs of the Gulf States. These are as follows:

- * Develop a working mechanism to identify the capabilities and roles of the forces of the GCC countries and the U.S. armed forces in the field of Environmental Security;
- * GCC Member States should find ways to benefit from the expertise of the U.S. Army in Environmental Security, such as specialized training and conducting joint exercises to combat the consequences of pollution and environmental dangers;
- * Assign GCC military personnel to attend courses run by the U.S. Coast Guard; and
- * Exchange training expertise and support the preservation of environmental technologies.

I would like now to go over what has been achieved since the first seminar at the level of the armed forces in the GCC countries. A committee for Environmental Security was created at the level of the armed forces of the GCC countries that played an important role in this field. This committee has met twice: in Muscat, May 27-30, 2001 and Kuwait, March 10-13, 2002.

The seminar in Muscat had the following agenda:

- * Unify the concept of Environmental Security from the military point of view in the GCC countries;
- * Determine and outline principles and rules for the protection of the environment from the military point of view and ways of applying them;
- * Raise the awareness among military personnel for the protection of the environment and publicize environmental awareness and

- educational programs in the armed forces;
- * Prevent the negative effect on military personnel in the case of an environmental pollution incident;
 - * Adopt environmental contingency plans;
 - * Adopt a system for penalties, violations and inspections;
 - * Follow up on the latest developments in the fields of protecting the environment and preparing rules, regulations and guidance and technical instructions.
 - * Train, exchange experts, information, visits, seminars, coordinate in the various environmental fields, and promote a unification of attitudes towards international problems related to environment.

The agenda of the Kuwait meeting included the following points:

- * General air, land and sea fields.
- * The existing system for inspection, penalties and violations in the armed forces.
- * Environmental rules, regulations, technical and guidance instructions.

The achievements of the Sultan's Armed Forces are as follows:

- * The formation of a permanent committee for Environmental Security in the Sultan's Armed Forces and the activation of special operations for the protection of environment;
- * Abiding by what was agreed upon in the special meetings for Environmental Security in Muscat and Kuwait;
- * Activating the awareness role within the Sultan's Armed Forces through lectures, seminars and workshops in coordination with the Ministry of Regional Municipalities and Environment and Water Resources.

The protection of the environment and natural resources is a collective responsibility that is not limited by political borders. Therefore, one of the most important responsibilities of the armed forces is to protect the

environment and natural resources. This requires abiding by the rules and regulations and environmental laws and technical standards in all projects, while also observing the principles of sustained development in dealing with natural resources. It also involves the participation of all the specialized and responsible civilian authorities in case of any disaster of any kind. It is important to consider environmental dangers from a security point of view.

I hope that our meeting will be successful and that we will come up with beneficial results for our countries and armed forces, and thank you for listening.

**Interagency Training for Disaster Response Exercise,
September 2002**

**Brigadier General Nasser Mohammed Al-Ali
Special Assistant to the Chief of Staff
Qatar Armed Forces**

In the name of God, the Merciful, the Beneficent. Peace be upon you.

Ladies and Gentlemen, my brothers, I would like to thank you for being in Doha and for your interest.

Prior to the exercise, a seminar was conducted to inform the attendees on the effects of a weapon of mass destruction (WMD) and the procedures and measures used by the State of Qatar to respond to a WMD event. The seminar highlighted the roles the government departments have before, during and after the use of a weapon of mass destruction. The State of Qatar conducted a Disaster Response Exercise on September 1, 2002 at the Al Khalifa Tennis and Squash Complex. The exercise was an application of this theoretical seminar, and the overall results were successful. What we usually see on television is what happens after a disaster, with an emphasis on the role of the military. Frankly, the civil defense and the civilian authorities play a major role in disaster response. When these civil organizations work with the military, the military is faced with a problem of varying levels of expertise, and that is what we faced in this practical exercise.

First I will discuss the role of governmental departments in confronting the use of weapons of mass destruction by an enemy; then I will discuss the role of the armed forces. The governmental departments must coordinate with each other to manage the consequences of the use of a weapon of mass destruction. They must conduct prior planning and coordination among the various departments. The plan must identify the responsible authority (the person in charge) and the civilian central command for the incident. This necessitate the availability of the following: a database that combines together all the information available to the state, such as, means and types of communications equipment,

numbers of trained personnel for initial planning, types and amount of suitable equipment, and an adequate command and control system.

The governmental departments that participate in the response to a WMD event are the Higher Council for Emergencies, headed by His Highness the Prince; the High Committee for Emergencies, which is affiliated with the Ministry of Interior; affiliated emergency committees; various departments of the Ministry of Interior, such as Civil Defense and Emergency; Ministry of Health; Ministry of Information; Ministry of Foreign Affairs; the Ministry of Labor and Social Affairs (Office of Civil Service); and Ministry of Municipal Affairs. Each and every ministry has a role before, during, and after the use of a weapon of mass destruction.

The Supreme Emergency Board is responsible for conducting prior planning, financial and material capabilities, approving and establishing contingency plans that are presented by the high council for emergencies, and emergency crisis management. The Board is the primary national body responsible for seeking assistance and aid from the International Agency for Atomic Energy and friendly non-governmental organizations through the Ministry of Foreign Affairs; and using plans and scenarios of the various action plans for crisis management.

The High Committee for Emergencies is responsible for conducting comprehensive planning for any incident that might happen through the use of various scenarios; supervises the emergency in the National Operations Center (NOC); supports the emergency committees; collects and processes information during the state of emergency; and prepares recommendations for adoption to the Higher Council for Emergencies.

The Emergency Committees consists of both administrative and management personnel (director and advisors), consultants, police services, civil defense personnel, transport companies, hospitals, radio and television stations, and chemical warfare experts. The tasks of these committees are: planning for emergencies and carrying out exercises and scenarios. These exercises should be as realistic as possible. Supervision of emergency work, so that the same people would supervise emergency work when the need arises.

The Emergency Committees includes a national network for radiation monitoring. In the Central Command Room there is a network set up to connect computers to radiation monitoring stations. The Committee has established a working group in the meteorology center to monitor possible climate changes, such as the movement of the wind that could affect the disaster area. There are central laboratories to conduct radiation and chemical analysis. The WMD Prevention Division, under the Supreme Emergency Board's direction, is responsible for providing guidance and advice and to conduct research before an incident. During and after the incident, the Division is responsible for detecting the types of gas used, continuing to collect information, and defining the radiation hazard area to establish security barriers in order to prevent people from approaching the location of the incident and to secure the area to reduce casualties.

The Ministry of the Interior is responsible, before an event, for training the civilian population on civil defense tasks and creating specialized technical cadres capable of intervening in case of an incident. Of course, the Civil Defense in the State of Qatar is very well trained and was very useful during the exercise. The aim of the exercise was to coordinate and ensure unity of effort among the various agencies and the civil defense personnel proved to be very experienced.

The Ministry's roles when a weapon of mass destruction has been used are to warn the citizens, control entry into and exit from the contaminated area, participate with the military in securing the areas to prevent extra casualties, keep the main roads open, organize movement, and in some cases, activate the fire fighters. The Ministry is concerned with keeping the internal security in case of incidents, because some elements might take advantage of the chaos that could take place. So the Ministry of Interior must maintain law and order, even in the case of such an incident.

The Ministry's roles after the use of a weapon of mass destruction are to supervise the roads, keep people away from the place of the incident, and find shelter for the refugees. The incident could happen in a commercial center or in a sports complex; in that case, these people should be taken away for further inspection to ensure their safety and

to ensure that that they have not been exposed to harmful effects. The Ministry would also help in supplying water, food, and shelter.

The Ministry of Health, prior to an event, is responsible for providing information about possible treatment. The Ministry of Health was represented by the Hamad Hospital's Emergency Department, which is very experienced in disaster response. The exercise included the use of private hospitals. These hospitals received some of the casualties and supplied us with additional information about possible treatment. The Ministry sets up specialized departments at the hospitals to isolate the casualties from existing patients in order to minimize cross-contamination. Various tablets were used for medical treatment to reduce the effects of the different gases. Lastly, the Ministry's task is to train the civilian population to cooperate with the media.

The Ministry, during the use of the weapon of mass destruction, is responsible to provide adequate medical care, distribute medications, and provide health care to the casualties. There is always a field hospital as well as Hamad Hospital for emergencies, and there is participation by all the departments at the Ministry of Health, whose personnel would take suitable measures before moving the casualties to the hospital. The tasks after the use of the weapons are to follow up with the long-term care of the injured, to continue providing medical care for the refugees, to take preventive and health measures, and to provide for mass cemeteries.

The Ministry of Information, before the use of a WMD is responsible for preparing and educating the civilian population through the media, radio, television, and newspapers, and publishing recommendations and instructions on how to deal with the effects of the weapons of mass destruction. The Ministry's tasks during the use of a WMD, is to focus on the media and provide the citizens with information. Here in Qatar, thank God, we have an open policy. Nothing is kept secret. Television should schedule and air scientific programs to reassure the citizens and educate them about the effects of these devices. Additional tasks include the formation of working groups, that includes trained broadcasters, to convey the actual reality to the citizens, continuing to air scientific programs, and continuing to broadcast updates and developments to the civilian population.

The Ministry of Foreign Affairs, before use of a WMD, is responsible for coordinating with participating departments on the emergency plan, in relation to our international responsibility. This includes coordinating and establishing communications with foreign and Arab governments and with international agencies. The Ministry's tasks, during the use of a WMD, are to provide the technical information received from the International Center for Security and to inform the international organizations. If needed, the ministry would ask for assistance from the international community. The Qatar Embassy will request experts from other countries to benefit from their experience in eliminating the pollution after the use of a WMD. The Ministry's tasks, after the use of a WMD, are to continue clarifying the situation at the international level as to how the incident happened and to coordinate with the sister and other friendly countries concerning technical and financial contributions.

The Ministry of Social Affairs and Labor (Civil Service Office) is responsible for coordinating with local organizations to provide tents and camps for the casualties and for preparing collection centers for collection of financial and other contributions.

The role of the Armed Forces in countering the enemy's use of a WMD is to provide trained personnel to ensure a proper response and expertise, to ensure that the Corps of Engineers cooperate with the civil authorities, to ensure that the Armed Forces have a sufficient number of camps that can shelter the refugees and provide medical treatment, to use expedient transportation methods for the evacuation and rescue of casualties and personnel, and to provide chemical defense units to detect chemical, biological, or radiological contamination and provide technical advice and expertise.

The peacetime roles of the Armed Forces in reducing the effects of a WMD event are to increase the level of education for the prevention of contamination for both military and civilian personnel and to improve the quality of communications equipment to expedite the early warning system. In the case of early warning, there should be a fast communications system to warn the citizens and the authorities responsible for the area where the strike is expected to take place. The Armed Forces is responsible for using and maintaining up-to-date detection and monitoring equipment. The Armed Forces creates

and establishes shelters for the State of Qatar's strategic targets. The Armed Forces are also responsible for equipping all equipment with filters to function in a contaminated environment, so that the work of vital government departments does not get interrupted; for linking the information network to a database and maintaining it with the latest information; and for using the capabilities of the Atmospheric Forecast Center to obtain the necessary information about the weather and the direction of the wind, so that the downwind hazard areas are warned and evacuated.

The various commissions and directorates of the Armed Forces have different roles to play, during the use of WMD, such as the administration of operations, personnel, supply and logistics, engineering, signaling, maintenance, military police, information, and intelligence. The Directorate of Operations and Training is responsible for the coordination among the branches of the Armed Forces and the allocation of weaponry, for gathering data, conducting planning, and for making the necessary modifications to address the changing situation. The Personnel Department would track losses and mobilize personnel as needed to make up for the ensuing shortage, so that there are enough personnel to carry out evacuation and the sheltering of casualties and the evacuated population.

Logistics and Supply would mobilize mechanized assets and equipment to respond to the WMD event. It is responsible for making up any deficiency in the food supplies due to contamination. Since this is the department responsible for the provisions of the Army, it could help support civil authorities in that task. The Directorate is responsible for providing a sufficient number of medical evacuation units and augmenting the capabilities of the deployed medical units. Medical services will fall under the supervision of the Armed Forces. However, the Directorate of Operations controls some of these medical evacuation units, but their role is secondary to that of Logistics and Supplies. Logistics and Supplies will provide tents and blankets for the shelters and supplement the means of transport for the provision of potable water, for the purposes of pollution remediation (decontamination) and life support.

The Corps of Engineers would contribute to decontamination efforts, repair any roads that have become unusable, retrieve all polluted

equipment, prepare necessary shelters, such as hangars, in the safety zone far enough from the affected areas, and coordinate with the intelligence personnel in the area to detect the locations, movements, and methods involved in the launching of the weapons of mass destruction. The intelligence services should be present to collect precise information about the location of the launch and the target.

The Signal Corps is responsible for maintaining communication equipment, providing rapid warning to other communication centers that constitute a potential target, and repairing any damages to communication equipment.

The Maintenance Corps is responsible for evacuating and repairing damaged equipment.

The Military Police regulate and control the movement to the shelters to avoid traffic congestion.

The Morale Guidance Directorate (Psychological Guidance) plays a major role in raising the morale of military personnel and civilians. They spread awareness in regard to weapons of mass destruction through the media.

The Information Corps and Military Security authorities' tasks are to coordinate among the intelligence personnel, define the polluted areas, assess the chemical damages and radiation, and take the necessary measurements to detect the type of gas used and the amount of time it would take to dissipate, as well as its likely effects. They take and send oil and water samples to the University and Hamad Medical Center for analysis, and they carry out necessary decontamination measures in the area. They are responsible for providing the Armed Forces with individual and collective protective gear and for coordinating with civil authorities to supply them with individual and communal means of protection.

This was the theoretical part of protection from weapons of mass destruction. We tried to apply these theories in practice during the Disaster Response Exercise conducted at Al Khalifa Tennis and Squash Complex. Thank God it was successful. The purpose of the exercise was to activate the Joint Defense Initiative with the U.S. side and assess

the immediate response from the ministries, authorities, and different administrations in the State of Qatar. As I mentioned earlier, each authority was used to operating alone, and at an earlier exercise at the Al Khalifa Stadium, each of the authorities, such as the civil defense and the Armed Forces, operated alone. However, during this exercise there was a total coordination and cooperation between the various authorities in the State, in order to assess their combined capabilities.

The exercise was conducted in two parts, the practical training on September 1 at the Al Khalifa Tennis and Squash Complex, and the theoretical training on September 2 at the Air Force base. The practical training started at 8:00 a.m., with twenty U. S. officers, civilians, and representatives from the Embassy and thirty officers from the State of Qatar, civilians, and non-governmental organizations (NGOs). In all, our side had more than 150 participants. The State of Qatar organizations included the Hamad Hospital Emergency Services, Ministry of Electricity and Water, Qatar Television, Ministry of Municipal and Rural Affairs, and the Red Crescent Society.

The exercise consisted of a simulated terrorist incident involving the detonation of a time bomb explosive containing mustard gas. We chose the Khalifa Tennis Complex because the first likely target would be that location or some commercial center, the Mall, City Center, or a similar place. Some of our citizens are quite unaware of this, so we preferred to hold the exercise in a closed place and follow with a public affairs statement in the media. Future exercises could be held in open areas, such as commercial centers, where you would find plenty of citizens. Also, we chose the Khalifa Tennis Complex to increase public awareness of this type of situation. In order to control the situation, we informed the Ministry of Interior. The Ministry, represented by the Civil Defense, arrived and helped evacuate the injured to the field hospital located at the internal triage area on site. The injured received first aid at the field hospital and then evacuated for additional treatment in the specialized departments in Hamad General Hospital. Doha airport contributed tents to the field hospital.

His Excellency, the Chief of Staff, sponsored the exercise and was very interested in following the progress of the exercise; this helped in making the exercise a success. We used all the available capabilities from

the Medical Services Administration of the Qatar Armed Forces and Civil Defense in addition to other authorities. We nearly used all the facilities available in the country. However, some assets and resources were unable to take part, although we do know they exist. We were able to take stock of all the capabilities within the state and how to best make use of them. The immediate response from the Administration of Civil Defense and Police, ambulance, and traffic patrols ensured the area of damage was isolated quickly and was conducted to the highest standards. Frankly, our Civil Defense is quite experienced in this field. They were very quick in responding; they secured the area and took the required measurements very quickly. The chemical investigation team from the Intelligence Agency and Armed Forces Security arrived at the appropriate time to detect and take numerous samples of the chemical agent for analysis. The Qatari Royal Air Force was very quick in responding. The Royal Air Force supplied the evacuation planes efficiently and evacuated the casualties to Hamad Hospital and other private hospitals.

Naturally there were some negative points, and we should mention them. It is important that the Civil Defense authorities distribute protective masks to the citizens at the site of the incident quickly in order to reduce the number of losses. These masks were unavailable or available in insufficient quantities. It is necessary to close all the doors and windows of all the ambulances at the incident site. We noticed that some of the ambulances were moving while the back door was unlocked. This is obviously due to lack of experience. Casualties were carried on ordinary stretchers, although they should have been transported in special bags for casualties in a contaminated environment. It is necessary to supply the Armed Forces and the Civil Defense with the necessary equipment for decontamination and to provide field laboratories to analyze the samples. These were the negative points, and we have made recommendations regarding them.

The participants on the first day were all from the Qatari side, while on the second day, the participants were from the Qatari and the U.S. sides. I mentioned that there were twenty personnel from the U.S. side on the first day, but these mostly stood aside, since their goal was to observe and assess the standards and training levels of our people. On the second day, both sides participated equally. There were ten U.S. and fifteen civilian and military Qatari personnel.

A brief description of the theoretical exercise; it was very simple: “The emergency center of operations receives several calls about an explosion of a time bomb at the Al Khalifa Tennis and Squash Complex. There are reports of fire, and the spread of a gas, among approximately three thousand spectators at an international tennis match. The incident results in two hundred deaths and six hundred injured spectators.” Obviously in the exercise we could not have three thousand people dead or injured, but the scenario was studied theoretically.

On the positive side, this was a test of efficiency, supervised by the Head of the Joint Committee. Their participation provided answers to some of the questions. The U.S. team tried to evaluate the readiness and capabilities of the Qatari site and asked comprehensive questions covering all aspects of the exercise. The scenario of the exercise was well planned. One of the negative points we noticed was the lack of experience because it was the first exercise of its kind. But the purpose of the exercise was to reveal such negative points.

We came up with several recommendations:

- a. Continue these exercises to reveal more negative points if there are any and to strengthen the positive points. We should especially continue holding theoretical exercises, since they do not cost much. All they would require would be inviting some guests to one location and getting together. We should increase the duration of the exercise. The committee recommended that the exercise should last from five days to one week.
- b. It is important to conduct training courses locally to raise the level of performance. Although we do run some of these courses, the U.S. side recommended raising the level of the courses.
- c. The committee reinforced the necessity of planning and importance of supplying the following:
 1. Appropriate reserve stock of special masks for civilians in order to supply them during a state of danger;
 2. Specialized bags, equipped with filters to clean the contaminated air, for transporting the casualties;

3. Serums and other necessary decontaminants for the treatment of victims of chemical injuries. Serums would be given after separating the casualties at the field hospital and before transferring them to the other hospitals in the country.
 4. Detecting equipment for chemical agents in the air and liquids, and a field laboratory to analyze these agents. There is also a need for special sterilizing equipment—not ordinary machines, which is what we used, since this was the first time we held such an exercise.
 5. References, books and scientific publications to increase the knowledge and awareness of weapons of mass destruction.
- d. It is important to appoint a public relations officer to respond to the queries of the casualties and to provide necessary statements to the media. This is the area of the psychological guidance department in the Armed Forces. This is very important if, heaven forbid, such an incident were to actually take place. It was not dealt with in this exercise because there was not enough time. The exercise was conducted at 8 o'clock in the morning and, as you remember, on the 1st of September the weather in Qatar was a little bit difficult, so we had to speed up the exercise. The exercise was supposed to last for two hours, but was conducted in forty-five minutes. For instance, the Civil Defense was supposed to respond in twenty minutes and we did it in five minutes to speed up the exercise while the very important persons (VIPs) were there. The main purpose was to coordinate among the participating units and establish working mechanisms.

This covers the seminar and practical and theoretical exercises conducted on 1 and 2 September. The seminar and exercises were a positive experience, and we salute the U.S. representatives who participated with us and gave us technical advice. We worked at the level of the state of Qatar. The experience encourages us to request similar exercises on a larger scale, at the level of the GCC countries, in coordination with the United States and other Allied States in the future.



CHAPTER III

POTENTIAL RISK SCENARIOS

Introduction

This panel was moderated by Brigadier General Hamad Ali Al-Hinzab from the Qatar Armed Forces. The objectives of the session were to provide the basis for work group discussion, to institute a regional approach to security cooperation on environmental issues, to strengthen the GCC capability to respond to environmental events that may degrade regional stability, to explore the processes and mechanisms available to address consequence management planning at a regional level, and to promote environmental cooperation between defense and environmental authorities taking advantage of opportunities for multilateral and interagency cooperation. The regional environmental challenges include: water shortages, hazardous materials and waste, oil spills in the Gulf, shipping incidents, industrial accidents, desertification, environmental terrorism, weapons of mass destruction, regional earthquakes, and transmission of new diseases. This session was tailored to engage the interests of environment, industry, and defense representatives on environmental management.

Petro-Chemical Environmental Concerns: Managing Environmental Pollution Resulting from Chemical and Hydrocarbon Materials

Mohammed Jassim Al-Maslamani
Qatar Ministry of Energy
Manager, Safety, Quality and the Environment
Qatar Petroleum Company

It gives me great pleasure to be here, and it is an honor to be with you for this very important event. This is a landmark event for the State of Qatar and for the civilian and military personnel of the Qatar Armed Forces. This is an opportunity put us together in one boat to handle all types of disasters. We have a civil challenge to respond to civil and other

disasters and a need to work together toward a solution to handle these kinds of emergencies.

My presentation on “Managing Environmental Pollution Resulting from Chemical and Hydrocarbon Materials,” focuses on the Safety, Quality, and Environment program of Qatar Petroleum (QP). There are several departments of Qatar Petroleum that handle the various activities of the oil and gas industry of the State of Qatar. Figure 3-1 shows the State of Qatar and our operational areas in the North Gas Field, with three operational platforms and at least six off-shore stations located near Halul Island.

These operational areas are critical to our operation. Qatar Petroleum maintains a reserve of more than one hundred trillion cubic feet of gas. Qatar ranks second in the world, after Russia, in natural gas reserves. The North Gas Field covers an area of approximately 6,000 square kilometers and has known proven gas reserves of 900 trillion standard cubic feet, which represents half the land area of Qatar. The main off-shore drilling sites are concentrated in the Mayden Mahzam Arab Fields C and D, Uwainat Reservoir, and Bulhanine Field. Qatar Petroleum has over seventy boats and barges involved in various marine, safety, and oilspill response.

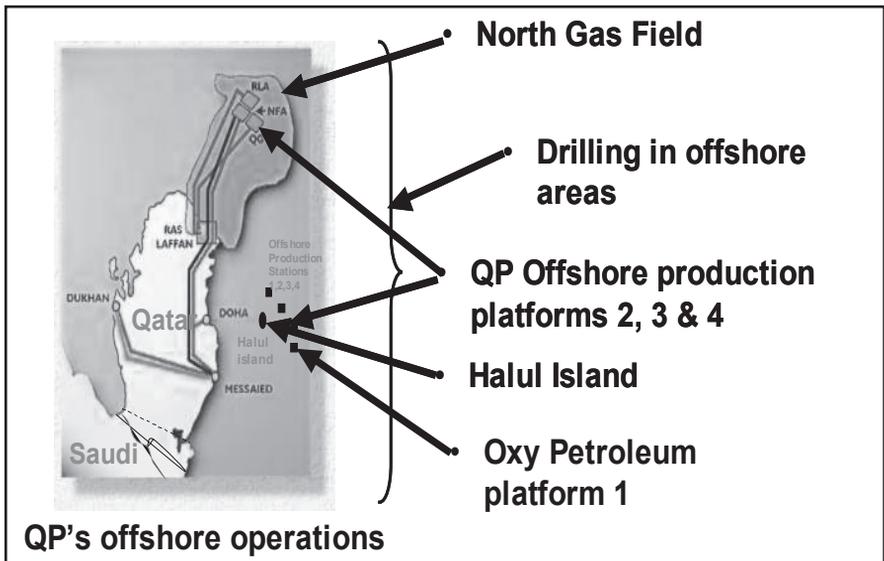


FIGURE 3-1: Qatar Petroleum Facilities

Qatar Petroleum and our partners Occidental Petroleum, Maersk Oil-Qatar, Elf Totale, and other partners operate numerous off-shore platforms. Halul Island is our primary off-shore export station. Qatar Petroleum exports almost half of our production from this station and has crude oil storage capacity of 1.2 million barrels of oil. The oil is only stored for two to three days, because of our active marketing policy. The island has on-site waste incinerators and air quality monitoring stations. There are on-site accommodations for more than five hundred staff personnel on the island.

The on-shore facility, located in Dukhan, consists of three oil reservoirs and one non-associated gas reservoir. Qatar Petroleum produces 335,000 barrel per day of oil and 330 million standard cubic feet per day (MMscfd) of gas production. The Dukhan oil and gas facility consists of a 60x25 kilometer area. The field has known reserves of 1,945 million barrels of oil and 211 million condensate.

Qatar Petroleum exports most or all of our on-shore oil and petrochemical production through our Mesaieed Port facility. This is a very essential industrial area. The facility consists of our refinery, port facility, and our petrochemical companies, QAPCO (Qatar Petrochemical Company) and QAFCO (Qatar Fertilizer Company). Qatar Petroleum operates the Ras Laffan Port, our only export facility for liquefied natural gas (LNG) in Qatar. The port has a current capacity of about twenty million tons of LNG, and efforts have begun to upgrade the capacity. The major producers located at the Ras Laffan facility are Qatar Liquefied Gas Company (Qatar Gas) and Ras Laffan Liquefied Natural Gas Company (RASGAS). They are the main producers of liquefied natural gas in the State of Qatar.

I have provided a background of Qatar Petroleum's oil and gas production and now will discuss the five elements of Qatar Petroleum's Environmental Security Management Plan, consisting of a Chemical Material Management System, Oil Spill Contingency Plan, Risk Assessment, and Monitoring/Control of Discharges.

The Chemical Material Management System is an on-line database for all chemicals handled by Qatar Petroleum. An individual can conduct a search of the database for information on any material purchased or

used by Qatar Petroleum. For example, caustic soda (sodium hydroxide), the database provides data from the Material Safety Data Sheet (MSDS) on the physical and chemical dangers, occupational exposure limits, fire properties and fire fighting procedures, acute hazards and symptoms, prevention and first aid, storage and spill procedures, clean-up and disposal information, and other items of interest.

Qatar Petroleum has an on-line Emergency Response Card (ERC). This card provides all the information required regarding a small or large fire or tanker fire, flammability of the material, methods of handling, procedures in case of a small and large spill, and first aid procedures. Again, all of our materials are covered by this system.

Qatar Petroleum has developed a waste management chart for each type of waste. All of our waste produced, solid or liquid, is categorized, and a chart is produced for the system. Each chart consists of twenty-six entries: description, classification, hazard rating, composition, appearance, toxicity index, environmental performance indicator, safety hazards, safety precautions, fire extinguishing agents, health hazards, first aid, personnel protection, environmental hazards, spillage mitigation, prevention at source, recycling, recovery opportunities, disposal method, treatment method, storage, labeling, container and packaging, and transport. It also provides the method for the proper handling of the waste. Most of our hazardous material is being stored within until a hazardous waste treatment center is built. Qatar Petroleum will operate a waste treatment facility by the end of 2004. This facility will assist the State of Qatar in handling the chemicals that it uses.

The next area of the company's Environmental Security management plan is Oil Spill Contingency planning. Each of our operational on-shore and off-shore facilities has oil spill contingency plans. The company conducts periodic drills and has a good idea of the capability of our personnel to respond to a spill. Qatar Petroleum has the equipment and resources to handle up to a ten-thousand-barrel off-shore oil spill. We are also in active cooperation with other regional operators in the Gulf to handle bigger oil spills.

We have established a Permanent Oil Spill Committee, which meets regularly to review and update the Oil Spill Contingency Plans. Qatar

Petroleum is working with the Qatar Supreme Council to upgrade our organization, planning, and resources to enable us to handle either an on-shore or off-shore national disaster. Qatar Petroleum actively participates in regional and international organizations who deal with environmental disasters and pollution controls, i.e. Marine Emergency Mutual Center (MEMAC), the Emergency Response Center in Bahrain, Gulf Area Oil Companies Mutual Aid Organization (GAOCMAO), recently renamed Regional Clean Sea Organization (RECSO), Regional Organization for the Protection of the Marine Environment (ROPME), and the International Oil Pollution Compensation (IOPC) Fund.

Another very important dimension of our Environmental Security Management Plan is the Emergency Response Plan. We have area-specific emergency response plans for all of our areas: Mesaieed, Dukhan, Ras Laffan, and the off-shore facilities. These plans cover all types of emergencies and are designed to protect assets, the environment and first of all, the people concerned. The Emergency Response Plan includes command and control rooms that are continuously manned with secure communications to marine, air, and state agencies. In Doha, we have a control room that controls air operations, primarily helicopters, to locate and track oil spill movement. These control rooms are an essential backbone of our oil spill and emergency response plan. Qatar Petroleum assets are protected by state-of-the-art fire and safety detection and protection systems.

The previous discussions were on the reactive or response type of operations. The Environmental Security Management Plan also includes proactive measures. Qatar Petroleum conducts Quantitative Risk Assessment (QRA) for all our projects and stations. QRA estimates the magnitude and significance of risks (fire, explosion, and hence the impact on the environment) and assesses the viability of proposed risk reduction measures for all risks. Qatar Petroleum uses internationally recognized bodies and consultants assist in the QRA process.

Qatar Petroleum has an active Monitoring and Control of Discharge program. Each facility has an air monitoring station. We use the Best Available Technique Not Entailing Excessive Cost (BATNEEC) in all of our projects and for any modifications to the plans in order to minimize the impact on the environment. We are developing plans to

reduce fugitive emissions and flaring, which is one of the most important activities within Qatar Petroleum.

In conclusion, Qatar Petroleum is doing its best to improve and minimize emissions. We are monitoring all of our discharges. This is really a mandate that we have to stand behind. We try to reduce our risks of incidents and accidents, including safety risks and other risks. We are trying to finalize the national contingency plan. Qatar Petroleum is linking its operations with the Supreme Council and with others, like the Qatari Armed Forces. We have our own contingency plan and emergency agreement with the Qatar Air Force and with the Ministry of Interior in case of emergencies, but we need to go further in this regard. We try to integrate of all our local plans and national emergency response plans with the permanent committees and emergency committees.

The Gulf Region is dependent on the oil and gas industry, which face similar Environmental Security risks. We need to work hard to protect this product and protect the environment, you know, without affecting the environment. In this regard, the establishment of a Regional Emergency Response Center is highly desirable, as it would facilitate more effective and speedy emergency response and coordination.

Water: Distribution and Water Quality in Qatar

Abdul Rahman Ali Al-Naama
Water Quality Engineer, Environment,
Safety, and Quality Department
Qatar General Electricity and Water Corporation (Kahramaa)

Thank you Mr. Chairman, and on behalf of Kahramaa, I would like to thank you and the organizers.

First, what is drinking water? Drinking water is, “pure water, used by people without any negative stress on the human or on lives, and it is considered to be that which has low levels of dissolved and suspended solids and obnoxious gases, as well as low levels of biological life.”

Therefore, one of the main objectives for Kahramaa is to provide high quality drinking water to our consumers. In addition, Kahramaa’s other objectives are to provide electricity for the consumer and the State of Qatar Development Projects at reasonable prices, increase the level of Qatarization, preserve the environment and support water quality excellence, upgrade the level of safety and occupation health, develop and modify water and electric networks, upgrade consumer service, and this is a very important point, conduct business planning and development.

Why am I concentrating on water? Our region is very poor in natural drinking water sources. Kahramaa uses 95% desalinated water in the production and delivery of drinking water. Kahramaa’s water supply network consists of approximately 3,300 kilometers of pipeline and 1,350 tankers. Kahramaa serves approximately 136,500 consumers through pipeline service and approximately 7,700 consumers by tanker service. Additionally, Kahramaa uses wells for rural areas and reverse osmosis technology in areas like Abu Samra and Al-Shamal North Camp.

The water network begins at the desalination plant. The fresh water is transported through the pipeline to main storage tanks or reservoirs. The water is pumped from the storage tanks or reservoirs to the distribution towers. The water is transported by pipeline or water tankers to the consumers. Water sampling points are located at each point in the distribution process and at water wells to monitor water quality throughout the system.

Reservoir	Storage Capacity
Ras Abu Fontas (RAF) A	38.5
Ras Abu Fontas (RAF) B	19.5
Old Salwa Road	9.0
New Salwa Road	36.0
Old Air Port	24.0
Al Guwaria	36.0
West Bay	30.0
Messaied	6.0
MIC	16.0
Al-Wakrah	4.0
Industrial City – Doha	6.0
Al Shamal City	4.0
Al Khor	4.0
Al Wasail	1.0
Bain Hager	6.0
Mazrouah	1.5
Al Shahania	1.5
Al Ghwaria	0.6
Abu Samra	0.6
TOTAL	240.0

FIGURE 3-2: MAJOR WATER RESERVOIRS AND STORAGE CAPACITY (MILLIONS OF GALLONS) IN QATAR

There are many reservoirs located in the State of Qatar. The major reservoirs and storage capacity in Qatar are listed in figure 3-2.

The company's total water production has increased annually to meet increased consumer demand from an increasing number of consumers. Total water production has increased from 58 million cubic meters in 1982 to approximately 150 million cubic meters in 2000 (figure 3-3).

During the same period, the number of consumers has increased from 38,000 to 100,000. The company has increased monthly water production to meet the demand. For example, figure 3-4 indicates the monthly water production in the year 2000. As stated earlier, Kahramma serves approximately 7,700 consumers by water tanker service. The company anticipates eliminating the tanker service over the next three or four years as additional pipelines are manufactured.

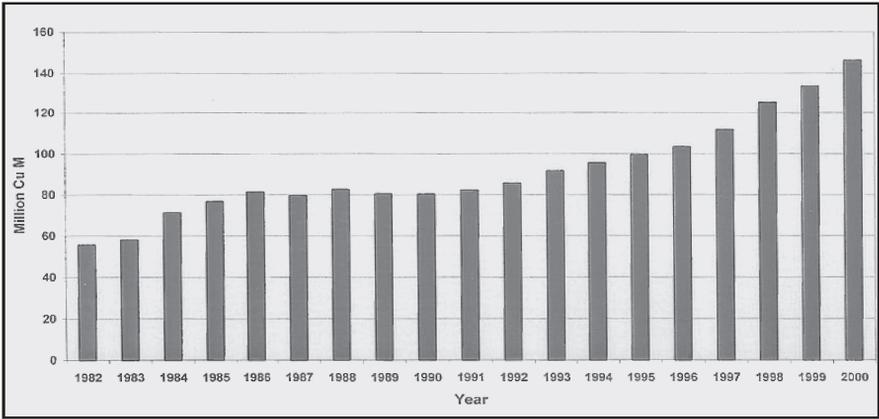


FIGURE 3-3: YEARLY TOTAL WATER PRODUCTION

Kahramaa is concentrating its efforts on reducing water pollution during water production and distribution. The major sources of pollutants that the company is trying to eliminate are desalination unit discharges, industrial waste water, activities near the stations, discharges and landfills from the cities, accidents—to include oil accidents—and port channel activities. There are many types of pollutants, but the company is primarily focused on two types of pollutants, chemical and biological. Chemical pollutants include volatile organic contaminants (industrial and chemical solvents), inorganic contaminants (including heavy metals), and synthetic organic contaminants.

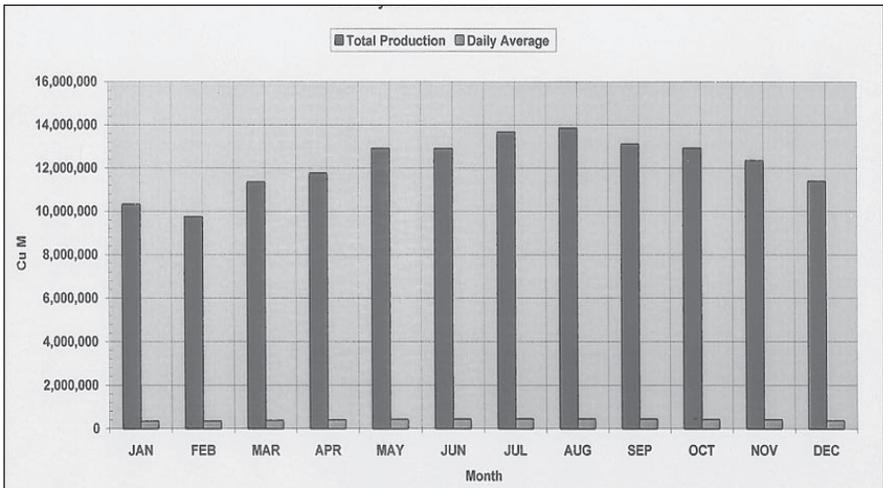


FIGURE 3-4: MONTHLY WATER PRODUCTION IN 2000

The Arabian Gulf Region has a long history of water pollution as a result of oil pollution resulting from water ballast, tanker accidents, off-shore drilling accidents and activities, oil production accidents, terminal operations, and bilge water. Since 1979, there have been twelve major accidents and spills involving oil pollution (figure 3- 5). The two major accidents resulted from from the oil well fires during the Gulf War in 1991 and from an oil tanker spill near the United Arab Emirates in 2000.

Water is sensitive to oil pollutants. What happens to oil spilled in a marine environment? The oil spreads in a slick formation and begins drifting with the ocean current. As the spread drifts, the oil begins to evaporate, dissolve, and disperse as it mixes with the water, emulsifies, begins the process of photo oxidation and micro-biodegradation, and finally settles as sediment. Some of the effects of hydrocarbon pollutants and heavy metals pollutants on humans are an increased risk of cancers, anemia, damage to the nervous systems, kidney and liver problems, reproductive difficulties, hair and fingernail loss, bone problems, blood problems, and eye, nose, and stomach discomfort.

Kahramaa checks the physical characteristics of water (color, taste, odors, temperatures, and turbidity) and inorganic compounds (aluminum, sulfate, copper, zinc, fluoride, sodium, iron, chloride, and total dissolved solids (TDS)) that lead to increased human complaints. Kahramaa conducts chemical sampling for heavy metals like arsenic,

- 1979- Oil Tanker Crashed in KSA, 111 t/d
- 1980- Oil Spilled from Abadan Port. Iran
- 1980- Oil Spilled from Hasba Well, KSA
- 1982- Oil Spilled from Al Ahmadi Port, Kuwait
- 1982- Oil Spilled from Niroz Well, Iran 7m t/d
- 1987- Oil Spilled from Pivot Tanker, UAE
- 1987- Oil Spilled from Safaniyah Well, KSA
- 1988- Oil Spilled from 5 Tankers in the Gulf
- 1991- Oil Spilled from all Wells in Kuwait,(Gulf War)
- 1994- Oil Spilled from Off-shore wells in KSA.
- 1996- Oil Spilled from Oil Jetty in KSA
- 2000- Oil Spilled from Tanker in UAE

FIGURE 3-5: OIL POLLUTION IN ARABIAN GULF HISTORY

cyanide, barium, lead, beryllium, mercury, boron, nickel, cadmium, nitrate, chromium, and nitrite. Lastly, water samples are checked for organic chemicals from pesticides, polyaromatic hydrocarbons, organic halogen compounds, chlorinated alkanes, chlorinated alkenes, and phonemic compounds. The results from each sample are annotated on a Water Analysis Report (figure 3-6). The form, normally issued by our central labs, lists the most common contaminants in water and the results compared to World Health Organization (WHO) standards. The report has an area for biological tests and results. Finally, the form indicates whether the water is suitable for use or not.

The company takes water samples throughout the desalination process. It begins with samples from the sea, then samples are taken after the chlorination units, of the desalinated water, and after that, from the final product and before pumping through the system. The management of water in Qatar is divided into three main sectors: the production of water by private companies, distribution by the government, and wastewater management by the government. Figure 3-7 is a sample taken from

Sent by:		Total Hardness as CaCO ₃		mg/l	Free Carbon Dioxide (CO ₂)		mg/l		
Reference No:		Total Alkalinity as CaCO ₃			Dissolved Oxygen (O ₂)				
Nature of Sample:		BOD			Hydrogen Sulfide (H ₂ S)				
Where Collected:		COD			Free Chlorine (as Cl ₂)				
Date of Collection / Production:		TOC			Total Chlorine (as Cl ₂)				
Date of Analysis:									
Temperature : °C at time of collection				mg/l	Microbiological Examination				
Appearance:		Albuminoid Nitrogen as N			Std. Plate Counts / ml				
Turbidity: (NTU). Salinity: (ppt)		Phenolic Compounds as Phenol			Total Coliform / 100 ml				
Colour: Hazen Units		Anionic Detergents as ABS			Fecal Coliform / 100 ml				
Odour: Taste:		Polynuclear Aromatic Hydrocarbons, as PAH			E-Coli / 100 ml				
Electrical Conductivity: µS / cm.		Petroleum Hydrocarbons							
pH: TDS: mg/l									
Parameter	WHO	mg / l	Parameter	WHO	mg / l	Toxic Substances	WHO	mg/l	Remarks
Aluminium	0.20		Bicarbonate	-		Arsenic	0.01		1 - WHO guideline values given in WHO column. 2 - All species determined as written 3 - Sample suitable for drinking <input type="checkbox"/> 4 - Sample not suitable for drinking <input type="checkbox"/> 5 - Resample <input type="checkbox"/>
Ammonia	1.50		Bromide	-		Cadmium	0.003		
Calcium	-		Carbonate	-		Cyanide	0.07		
Chromium	0.05		Chloride	250		Lead	0.01		
Copper	1.00		Fluoride	1.50		Mercury	0.001		
Iron	0.30		Nitrate	50.00		Selenium	0.01		
Magnesium	-		Nitrite	3.00		Total organic carbon	-		
Manganese	0.10		Phosphate	-					
Potassium	-		Silica	-					
Sodium	200		Sulphate	250					
Zinc	3.00					Disinfectant by-products (ppb)			
						Carbon tetrachloride:	(WHO-200)		
						Chloroform:	(WHO-300)		
						Bromodichloromethane:	(WHO-60)		
						Dibromochloromethane:	(WHO-100)		
						Bromoform:	(WHO-100)		

FIGURE 3-6: WATER ANALYSIS REPORT

the Ras Abu Fontas and network in the past three months. The results are compared to the Gulf Cooperation Council (GCC), United States Environmental Protection Agency (EPA) and World Health Organization (WHO). Based on the comparisons, the purity of our drinking water is well above the minimum GCC, EPA, and WHO standards. Our drinking water is better than bottled water.

Figures 3-8, 3-9, and 3-10 show the results of the sample for inorganic chemicals, heavy metals, and organic compounds. Compare our sample for heavy metals with the previously stated organizations. For example, the level of arsenic in our sample is 0.001 compared to the GCC 0.01, U.S. EPA 0.04, and WHO 0.01. Based on these comparisons, our drinking water quality is well above the minimum GCC, EPA, and WHO standards.

In conclusion, Kahramaa will continue to conduct monitoring and sampling of our drinking water to ensure a safe supply of water for our consumers. We have established a central lab for testing drinking water, and have instituted very restrictive rules to save or control pollutants near our waters, and choose the right places for new desalination plants for the future.

	GCC	EPA	WHO	Potable Water from RAF & Network (ave.) 2-5/2002
Components	Max. limit Mg/Liter	Max. limit Mg/Liter	Max. limit Mg/Liter	Max. limit Mg/Liter
pH	6.5–8.5	6.5–8.5	<8	8.13
TDS	100–1000	500	<1000	150–180
Magnesium	150	140	140	4.5–4.8
Calcium	200	200	200	20–30
CaCO ₃	500	450	450	69.6–80
Sodium	200	200	200	19.2–30

FIGURE 3-7: CHEMICAL RESULTS FOR GENERAL SUBSTANCES

	GCC	EPA	WHO	Potable Water from RAF & Network (ave.) 2-5/2002
Components	Max. limit Mg/Liter	Max. limit Mg/Liter	Max. limit Mg/Liter	Max. limit Mg/Liter
Sulfate	400	250	500	5.3–10
Chloride	250	250	250	5.3–10
Iron	0.3	0.3	0.3	0.0016–0.025
Copper	1	1	1	0.0157–0.028

FIGURE 3-8: CHEMICAL CHARACTERISTICS: INORGANIC CHEMICALS

	GCC	EPA	WHO	Potable Water from RAF & Network (ave.) 2-5/2002
Components	Max. limit Mg/Liter	Max. limit Mg/Liter	Max. limit Mg/Liter	Max. limit Mg/Liter
Arsenic	0.01	0.05	0.01	0.001
Barium	2	2	0.7	0.0009
Beryllium	N/D	0.003	N/D	N/D
Cadmium	0.003	0.005	0.003	N/D
Chromium	0.005	0.005	0.005	N/D
Cyanide	0.07	0.2	0.07	N/D
Nickel	0.02	0.02	0.02	N/D
Nitrate	5	10	3	0.001
Mercury	0.001	0.002	0.001	0.0001
Lead	0.1	0	0.1	0.003

FIGURE 3-9: CHEMICALS OF HEALTH SIGNIFICANCE IN DRINKING WATER (HEAVY METALS)

	GCC	EPA	WHO	Potable Water from RAF & Network (ave.) 2-5/2002
Components	Max. limit Mg/Liter	Max. limit Mg/Liter	Max. limit Mg/Liter	Max. limit Mg/Liter
Carbon Tetra Chloride	0.02	0.02	0.02	0.01
Chloroform	40	44	<40	36.5
TTHM	0.1	0.1	0.1	0.05
PCB	0.0002	0.0002	0.0002	N/D
Benzene	0.001	0.001	0.001	N/D
Oil & Grease	0.0	0.0	0.0	N/D

FIGURE 3-10: CHEMICALS OF HEALTH SIGNIFICANCE IN DRINKING WATER (ORGANIC)

Health and Disease Response

Brigadier General Annette L. Sobel, M.D.
Assistant to the Chief,
United States National Guard Bureau
for Weapons of Mass Destruction and
Civilian Support

Mr. Chairman and honored guests. I am honored to be here, especially honored, as we are members of our respective Air Forces. I would like to talk a little bit at a fairly high level to discuss some ideas and concepts from the standpoint of my personal expertise, but you are really the experts. The message I am trying to get across in my talk today is that there is a continuing need for information sharing and partnering in the areas of health and disease response.

I will try and address some very broad issues, not only weapons of mass destruction—and what we also refer to as weapons of mass effect—because from a medical perspective, and certainly from a commander's perspective, the impact of these issues on your operations, on your day to day activities is important, not only for national security concerns, but for regional operations. How can we prepare and respond? What infrastructure and potential assets are available that we can use jointly? I will provide some overarching thoughts that hopefully we can expand on in our workshops.

We have three broad areas of threat: natural, technologic, and terrorism. These areas have been touched on earlier by other speakers, and they are very similar in many ways in terms of prevention and preparedness. In many of these areas it is not only the baseline capability, but how rapidly you can expand your capability and surge to deal with a crisis situation.

Historically, there are many examples, and I will just touch on a few, because it is important for us to understand as nations, as we go through exercises, response, and regional capacity building, that we need to build on lessons learned from the past. Without an ability to learn and share learning from our joint exercises, unfortunately, we relive things, and so we go back hundreds, perhaps thousands of years, when the whole

concept of biology and biological weapons was certainly employed. In more recent history, there have been industrial accidents that we have had to grapple with. How do we, as responders and commanders and national-level decision makers, actually deal with these occurrences from the standpoint of the information that we share with the public and our level of preparedness in terms of not only responding rapidly, but also mitigating and, hopefully, preventing.

In recent history, we all had to deal with the Aum Shinrikyo Tokyo subway attack, in which we began to learn again about the terrible effects of chemical agents. But I would like you not only to think of this as a response, an incident that had to be dealt with immediately, with managing casualties, but think of how we deal with the psychology and terror of such a situation. How do we convince our citizens that as governments and as senior leaders in the medical field and other related health fields, that we are not only prepared, but we are confident in our levels of preparedness?

In the United States, we have experienced various politically motivated acts of terror whose primary effects were intended to result from the use of biological agents. There was, for example, a well-known, well-publicized incident of salad bar contamination where the sole intent was to influence a political decision. There are many different types of scenarios that can occur. We must not only recognize the differentiating factors, but also understand the common basis for many of these acts. As senior leaders, we must also recognize that, as we move into the future, having a baseline of understanding in our countries of what is normal and what is not—in terms of the status of health of a population—is critical for determining whether something is unusual or unexplained in nature. In many situations, what we really need to understand is the unusual indicators and warnings that some occurrence is not consistent with a naturally occurring event.

Certainly in a technologic disaster, such as one that perhaps may affect water, oil, and natural gas, many of these indicators are much more obvious. However, there are times that the indicators may be much more subtle.

How, as medical providers, can we be part of the senior leadership team? How can we assist, by using the information that we have access

to routinely, in understanding what is significant and unusual? That is what I hope we can go into in more detail tomorrow. Often it is not just a situation of understanding an unusual case here or there, but it is something that doesn't quite fit a pattern. The difficulty comes when we don't understand what is naturally occurring. Where I live in the U.S. southwestern region, anthrax is not unusual. We have seen cases of anthrax and plague for decades. However, a case of pulmonary anthrax is unusual. Therefore, I would submit that you have to understand what is endemic in your region before you can determine whether an occurrence was an unusual event or something that you would consider highly suspicious.

We are also concerned about the concept of “all hazards,” hazards that may not only affect a day-to-day operations, but the long term ability of an environment to recover. So we are critically concerned about a number of areas. Psychology and working closely with the media and public affairs is something that we have learned is crucial. We have started developing checklists and templates for basic information that we know will be helpful in getting consistent, unambiguous information out to the people. This will reassure the public that we have a plan in place. It is also important for the public to understand, from the medical standpoint the limitations of our ability to respond and the areas in which they may contribute.

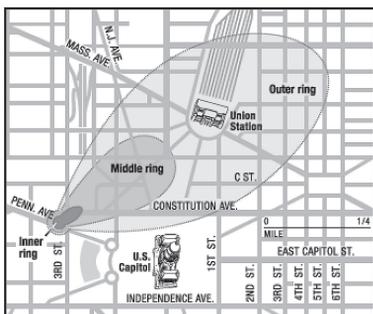
There are, I realize, very hard leadership issues that need to be addressed and often, as scientists, engineers, physicians, we get too immersed in detail. But how do we address the general good? How do we address taking care of the largest number of people and optimizing or having the best outcome? Ultimately, this is what is reassuring to the population. More importantly, how do we determine when we have done enough? Often, for medical providers, this is a very difficult decision to make. We have decision-making tiers to our medical operations, to include response and support to commanders. This process applies equally as well to real world operations such as oil drilling. I have worked closely in the past with people from Galveston, Texas, in understanding some of their oil drilling operations, how the operators work hand in hand with medical responders to assure that the best care is given to the greatest number in the event of an accident or disaster and to assure that

Hypothetical Contamination

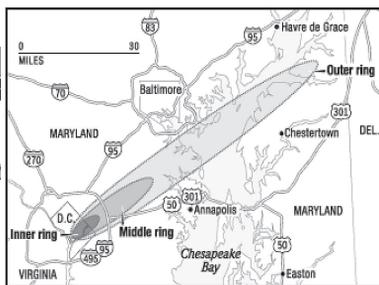
Following are case studies showing radiation contamination that could result from two types of “dirty bombs.” The models were generated by the Federation of American Scientists based on government data. In both scenarios, the immediate threat from radiation is small, but extensive cleanup and evacuation to guard against long-term exposure would be needed.

Long-term contamination risk from remaining radiation (without cleanup).

- One cancer death per 100 people.
- One cancer death per 1,000 people.
- One cancer death per 10,000 people.



Cesium Bomb: The small amount of cesium that could be found in a medical gauge is exploded in Washington D.C.



Cobalt Bomb: A cobalt 1x12 inch “pencil” from a food-irradiation facility is exploded in the same location. While more powerful than the cesium device, this material would be much harder to acquire and use.

FIGURE 3-11: DIRTY BOMBS CASE STUDY

there is minimal disruption of their capability to continue safe operations while continuing to protect the environment.

From a standpoint of training and joint operations, we try to address the full spectrum of potential disasters, from ones that we know that we obviously can contain and control, to those that are well beyond our abilities to control. We then address some of the critical shortfalls in our training.

One specific area that recently has received a lot of media attention is the whole concept of “Dirty Bomb” devices, which spread contaminated, aerosolized matter. These are devices that combine radioactive materials, such as spent nuclear fuel rods, and employ high energy explosives to detonate and cause broad scale contamination. What I would like to show you very quickly are two models—which are very dependent on meteorological conditions—that actually show a comparison of a Cesium versus a Cobalt incident (figure 3-11). The model takes place in an urban setting, one of the most difficult to model because of various air flow and laminar flow issues. We take these models in the context of

training people to respond intelligently, to prioritize their care in a setting where you may not have enough resources to go everywhere. How do you effectively and efficiently use those resources.

Is this a credible fear, or is it based on paranoid thought? Well, we go through a step-by-step analysis to determine if there are any credible reasons for this concern. I was very surprised when I saw some of the initial statistics that referred to an estimated 1,500 pieces of equipment, with radioactive parts, missing since 1996. This raises concerns about potential radioactive materials that cross borders and may go unrecognized as potential sources of a dirty bomb. There was a recent discovery of ten radioactive containers at a border crossing in Kazakhstan and a report of forty Russian suitcase nuclear bombs still missing.

I am now going to show you some of the medical capability that we have that is available for partnerships and joint training. The concept of modular health care that we use today, in which available assets are deployed in phases, evolved from a model developed by the United States Army a long time ago (figure 3-12). You use pieces and parts of critical skills that are necessary. Some may be public health, some may be laboratory, some may be environmental monitoring capability, and others may be modules such as surgical capabilities or preventive medicine.

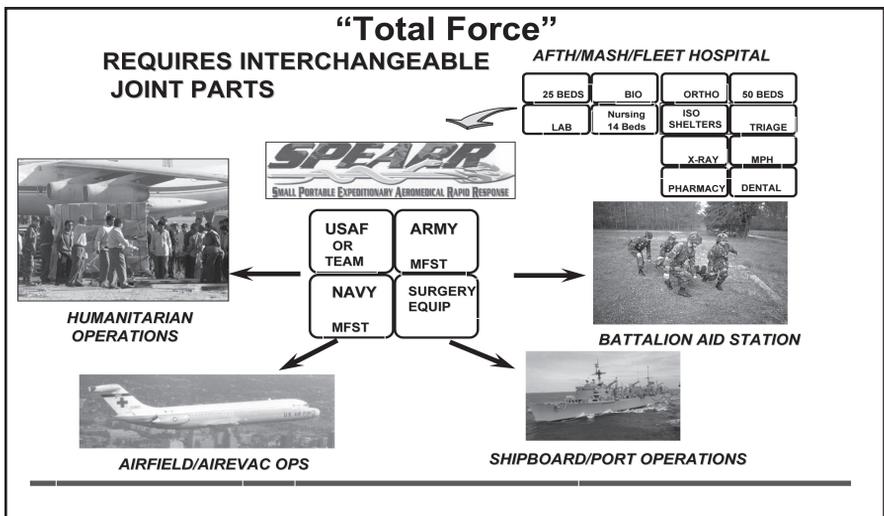


FIGURE 3-12: MULTIPLE SUPPORT ROLES; JOINT MEDICAL OPERATIONS



FIGURE 3-13: REGIONAL RESPONSE AND POTENTIAL PARTNERS

The number of partnerships that have developed here is certainly an evolution in promoting joint activities, whether they are in the context of exercises or regional response plans. We are trying to move forward in the future, recognizing that airlift may not be available and certainly may not be desirable in some settings. However, we want to be able to develop a medical capability that can be there to support the commander's needs as well as national needs if necessary. Again, there is much potential for regional partnerships in this area as well as increasing interest in partnering and exercises and in building templates that we all can benefit from. Figure 3-13 diagrams the concept of regionalization of the response and some of the critical infrastructure issues that are necessary for medical support.

Figure 3-14 shows the concept that I have just discussed. This is what we call the Red Wedge, which reflects the ability to surge capacity rapidly when you have early indicator that will be a problem. This concept may be employed during a crisis when you have to very rapidly decide what is necessary. It involves a fair amount of understanding and advance planning, given a whole host of potential scenarios, from natural to man-made disasters.

I want to quickly show you an example of a medical situation in Afghanistan that illustrates the use of our modular health care system in

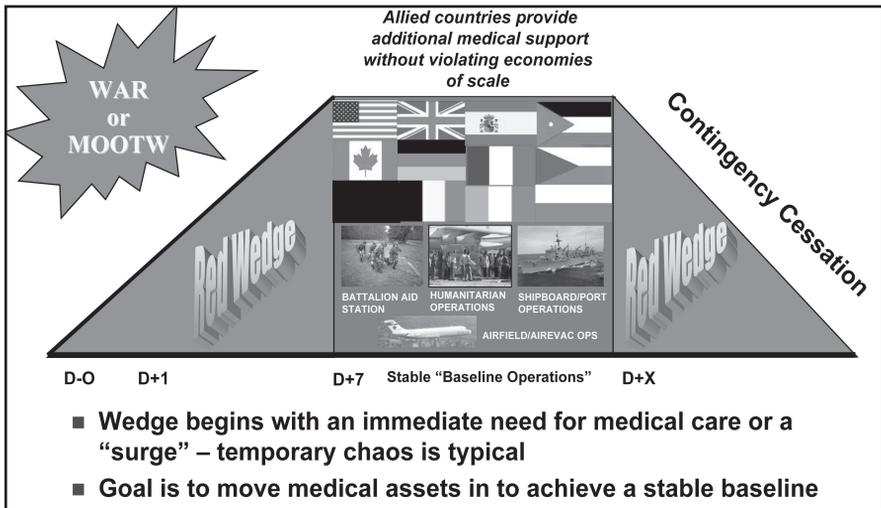


FIGURE 3-14: THE "RED WEDGE" SURGE CAPACITY MODEL

a forward staging operation (figure 3-15). The illustration uses a joint operations timeline. To minimize the impact to an ongoing operation, we strive to assure mission success. The first column deals with the time required for the care that was actually administered. The span of operation civil-military options for the rescue. In less than an hour, the rescue occurred, and within an eight-hour time frame, the casualties were stabilized. The ability to project care and optimally engage on a very

Injury Scenario: Military and Civilian Care Comparison				
	Elapsed Time Post Injury	Care Received	Military Setting	Civilian Setting
1	50 minutes	Rescue	ParaRescue	EMT-P
2	1.9 hours	Intubation/ Fracture Stb / Blood / Volume Expansion	Army Forward Surgical Team	Level I Trauma Center
3	6.9 - 8.1 hours	Stabilization / ICU Care in Air on C-130	CCATT / AE enroute	Level I Trauma Center
4	8.1 - 9.2 hours (transload to C-17) 9.2 - 16.5 hrs	ICU Care in Air Arrival in Germany	CCATT / AE enroute	Level I Trauma Center

Currently in Hospital in Germany



* Times & locations are estimated

FIGURE 3-15: RECENT SUPPORT OF WAR EFFORT: APACHE CRASH, 10 APR 02

local level was life saving. All of the patients have been released from the hospital and have returned to functional lives.

The concept of EMEDS (the expeditionary medical system) is an agile, mission-responsive modular functionality that can be adapted to meet real world needs, as illustrated in figure 3-16.

I have tried to describe the U.S. Air Force's global health program framework and partnerships that are still emerging. The United States has a number of educational programs across all services that seek partnerships and worldwide deployable programs that can be customized. The Air Force's flagship mobile education course is the Leadership Program in Regional Disaster Response and Trauma System Management. Since 1999, the Air Force has taught this course in twenty-six countries with over 1,200 participants. Several countries have hosted follow-on civilian-military courses, established trauma institutes, and incorporated the curriculum into their military medical academy as a result of the course. Trauma care has potentially far-reaching effects. The Air Force offers courses on International Aero-medical Evacuation, Critical Care Transport Course, Forensic Science and International Law for Public Health Officials and Health Care Providers, and a Trauma and Critical Care Pararescue Course. There are seven additional mobile education courses in development: trauma nursing; chemical, biological, radiological, nuclear, and high-yield explosive (CBRNE) military-civilian

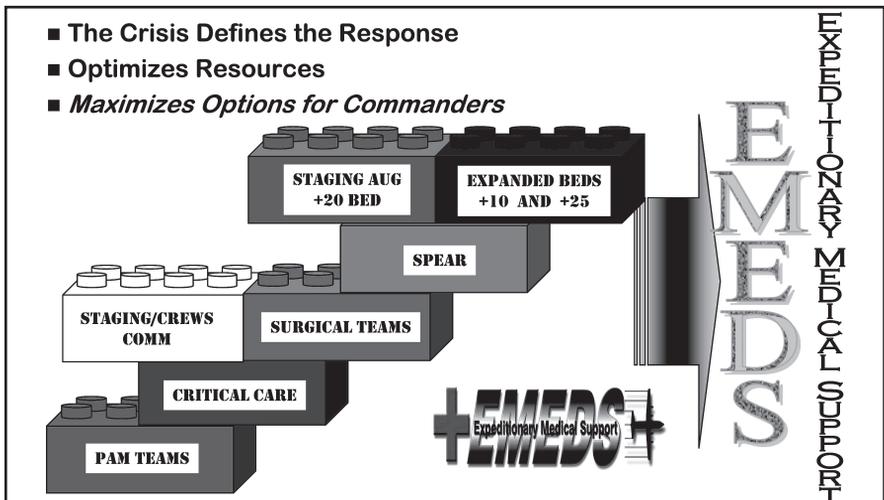


FIGURE 3-16: EMEDS (THE EXPEDITIONARY MEDICAL SYSTEM)

exercises; dental healthcare course; maternal-child healthcare course; pre-hospital care systems; HIV/AIDS; and sustainment of trauma and readiness skills. As you see, it's a spectrum, from the most common and basic of health care needs, such as in a humanitarian mission, to the full span of operations that might be necessary.

So what are the opportunities that exist? From a U.S. perspective, one of our interests is to understand coalition partnership needs and how to partner effectively in regional activities that can assist us in enabling the reduction and future elimination of the existing gaps and shortfalls in our system. The idea is to build a framework for capacity and resilience, moving beyond our response as medical providers to a focus on prevention.

In summary, as nations we have amazing capacity for response preparedness. We are trying to enable expanded prediction, prevention, and preparedness to the response cycle. But in many situations, that is not possible. So if we employ risk-assessment-based capacity building, we will have the ability to surge if needed. The true focus is regional response capacity-building. A parting challenge that I would like to submit to senior leadership is raise the bar of preparedness and embrace the medical community as an equal partner to mitigate the effects of environmental disasters, both natural and man-made.



CHAPTER IV

SECURITY AND ENVIRONMENTAL PLANNING IN THE 21ST CENTURY: REGIONAL MONITORING, WARNING, AND INFORMATION EXCHANGE

Introduction

**Mr. Trevor Hughes, Rice Hughes L.L.C.
Moderator**

The session explored the processes and mechanisms available to address consequence management planning at a regional level, demonstrated the quality multiplier effects of available information exchange and management tools, and identified opportunities for multilateral and interagency cooperation. The functional exchange of information is required at both an internal agency level, within a single country, and between regional states.

9/11: Multi-level Response and Management

**Lieutenant Colonel Randy Lambrecht
Deputy Director, Operations, Training and Readiness
New York Army National Guard**

Good afternoon. On behalf of the Adjutant General of New York, Major General Tom McGuire, I would like to express our gratitude for the invitation to participate in this conference. As you can imagine, the 9/11 attack on the World Trade Towers had an enormous impact on the National Guard operations in New York, as well as the state as a whole. What the New York National Guard did in support of New York civil authorities became the largest and longest military support operation ever in the state of New York. What I will try to do is to give you a glimpse of some of the highlights of what happened.

Despite the initial shock and dismay of the World Trade Center attack, the National Guard response was the result of civil-military planning with other state agencies, coordinated by the State Emergency Management Office (SEMO).

The map of New York shows the locations of New York's National Guard units, both Air and Army Guard. We have sixty-six Army Guard facilities across the state and five Air Guard bases as well (figure 4-1).

In coordination with New York's civil authorities, we have divided the state military forces into six joint task force regions (figure 4-2). These regions parallel the New York State Police and State Emergency Management Office, emergency management regions. A brigade, airbase, or higher-level command commands each joint task force region. The New York City area is in the Region One Response Area. This is commanded by the 53rd Troop Command, which is an Army National Guard troop headquarters, located in Valhalla, New York, just North of New York City. This region was initially in command during the 9/11 response to New York City.

Mission response to civil authorities in New York is controlled as follows: when a disaster happens, local authorities are the first responders

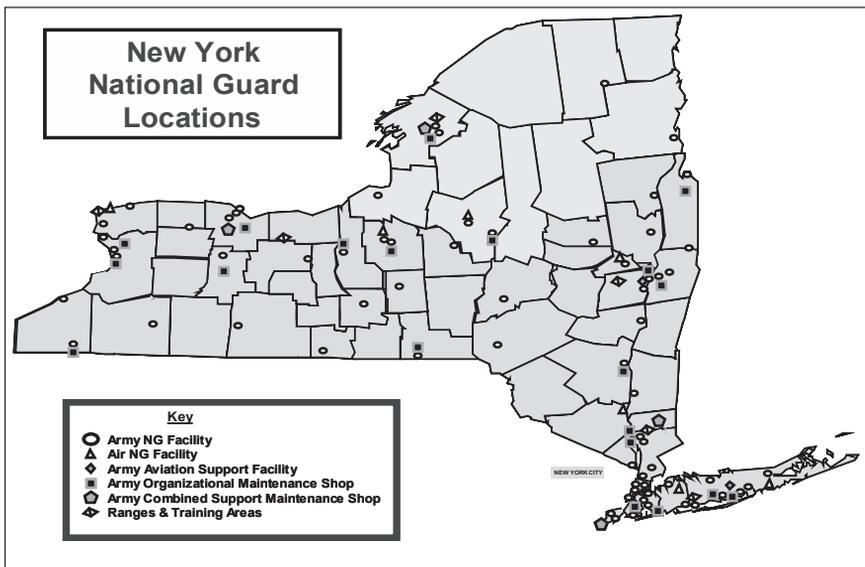


FIGURE 4-1: STATE OF NEW YORK NATIONAL GUARD LOCATIONS

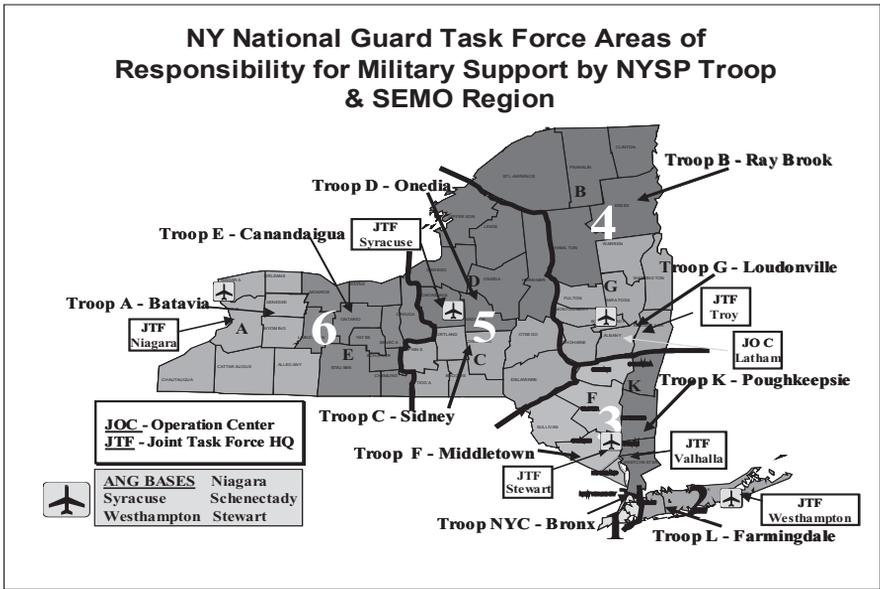


FIGURE 4-2: STATE OF NEW YORK JOINT TASK FORCE REGIONS

(figure 4-3). In the case of 9/11, the local authority was New York City. If additional assistance is needed, the local authorities request support to the next level, normally a county. Because of the immense size of New York City in comparison to counties of the state, their request for assistance went directly from the city straight to the State Emergency Management Office (SEMO). SEMO coordinates the task assignments

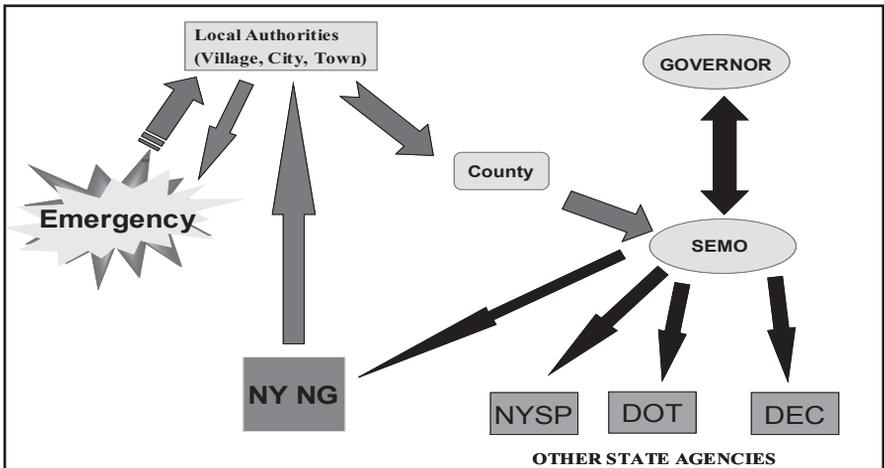


FIGURE 4-3: MISSION ASSIGNMENT AND COORDINATION

of state agencies in response to a disaster, including the National Guard. Once it is decided what the requirements are, then each of the state agencies, including the National Guard, provide their assets in response to the needs of the incident commander at the site, in this case, New York City.

Immediately following the attack, the Adjutant General recalled all National Guard state headquarters staff and stood up the National Guard state headquarters Joint Operations Center. The Deputy Adjutant General, along with key liaison staff, deployed to the State Emergency Management Office to establish liaison with state operations. I cannot begin to tell you how important the roles of liaison officers are in an operation like this with the state agencies. Not only are they important at the state level, but right down to the local level with the forward task forces. In the case of 9/11 this happened automatically, even before the Governor declared the state emergency.

The Governor ordered the Adjutant General to alert all units of the New York National Guard. Within twenty-four hours, the National Guard had responded with 8,000 soldiers and airmen at armories or air bases ready to deploy into the city. In New York, two other military forces were alerted, the Naval Militia and State Guard, which are state-level military organizations that, at the direction of the Adjutant General, also support emergency response and are also controlled by the state headquarters. Force Protection Delta was declared, Stewart Air National Base, Camp Smith, and the Park End Armory directly in New York City were established as staging bases. These tasks were completed even before we had specific missions from SEMO.

Division of Military and Naval Affairs (DMNA) represents the state's headquarters. SEMO is the State Emergency Management Office and is located about five miles from our National Guard state headquarters. In New York City, there were two key locations to coordinate with the civil authorities, the New York Office of Emergency Management (OEM), and the forward command center at the World Trade Center (WTC). The difficulty during this part of the operation was that the New York City Office of Emergency Management was located in the World Trade Towers, and was destroyed when the attack happened. The city had to locate their operations to what was eventually referred to as Pier 92, a pier on the west side of the Manhattan shoreline. In the interim, until New

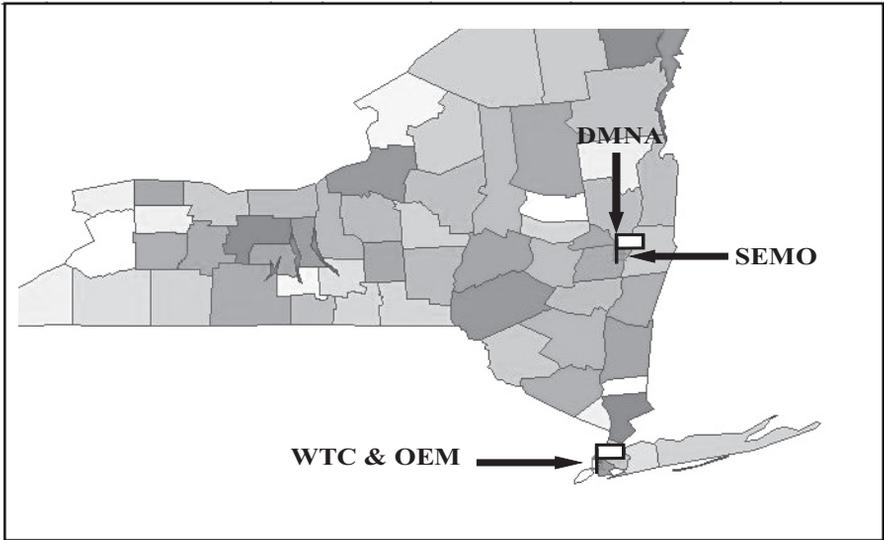


FIGURE 4-4: KEY COMMAND AND CONTROL LOCATIONS

at One Police Plaza served as the command post for emergency operations in the city (figure 4-4).

The initial staging bases were established at Stewart Air Base, Camp Smith—an Army National Guard training facility in New York—and the Park Avenue Armory (figure 4-5). The two staging bases slightly upstate were utilized to house and stage units that were coming from upstate into the city as the mission developed.

The staging base at Stewart Air Base is an example of the cross-agency coordination that happened in the state (figure 4-6). Note the cots that



FIGURE 4-5: INITIAL RESPONSE (STAGING BASES)

are in the picture. The National Guard does not have this type of cot in our inventory. These were supplied for soldiers housed at the airbase by the New York State Department of Corrections, the state prison system. This was coordinated at the state level, through liaison coordination accomplished at the State Emergency Management Office.

The initial National Guard response used National Guard units already located in New York City. The 107th Support Group, located at the Park Avenue Armory on Manhattan was tasked with command and control of the forward support base. The units listed in figure 4-7 were the first to respond.

The New York National Guard Headquarters also deployed our Civil Support Teams (CST) into New York City. The team conducted chemical, biological and radiological detection and monitoring. Because of their capabilities with communications assets, the team provided communications to agencies on site, to include the United States Federal Bureau of Investigation (FBI). Due to the fact that all the communications in the immediate area of the World Trade Center was out during the initial



FIGURE 4-6: STEWART AIR BASE, PHOTOGRAPH OF HANGAR

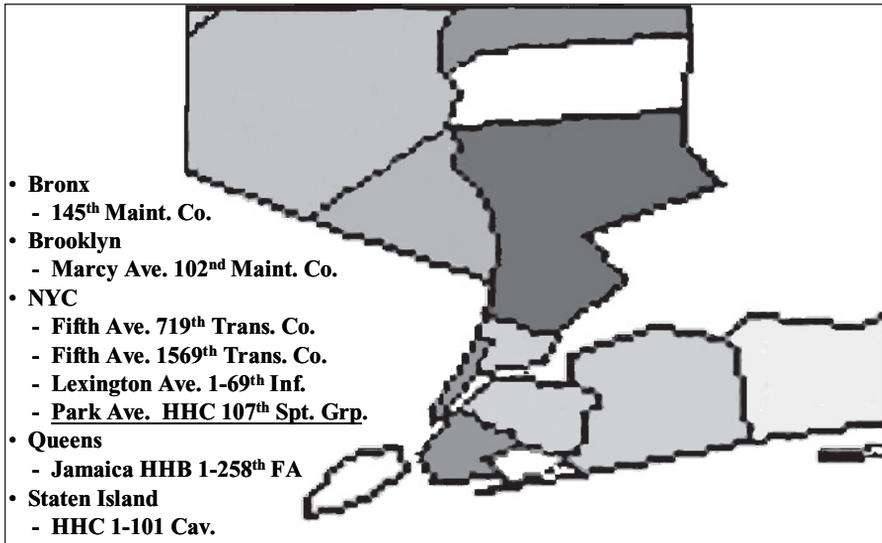


FIGURE 4-7: INITIAL NEW YORK CITY FIRST RESPONDERS

part of the operation, this support proved invaluable. The New York Air Guard, paralleling the ground operation, provided combat air patrols, air refueling, and tactical airlifts, as part of their federal mission, in addition to their state requirements. Additionally, as we employed the forces in the city, we began deploying units from upstate into the staging bases at Stewart and Camp Smith. These included engineer, military, police and medical units. The 53rd Troop Command was placed in command and control of the overall operation in the city. The first part of the mission during the first day used the troops that were stationed in the city. We employed 1,500 soldiers immediately in New York City and 3,000 within the first twenty-four hours. The objective of the first soldiers and airmen going into the city was to provide a calming effect. The Governor felt that utilizing the National Guard, the visibility of the Guard soldiers in the streets would provide a calming effect to the people in the city. This role for the National Guard turned out to be very successful in that process.

Communications became a very significant issue in the mission. We pushed forward the Air Guard's 274th Air Support Operations Squadron communications teams, located at Stewart Air Base. Also, a large amount of communication assets at the state headquarters used during state emergencies, from cell phones to handheld radios, were deployed into the city to be used with the forces that were already deployed to support their communications needs. A counter-drug team in New York State was

used to enhance security outside the New York City limits. They already had an existing working relationship with the U.S. Customs Department and were deployed on the state borders to help with border crossing and traffic control at all border crossing sites, not only on the border of New York, but in the city itself, for example, JFK International Airport.

Liaison teams were a major part of this operation. From the state headquarters we controlled the forward movement of liaison teams out of the state headquarters, directly into the Office of Emergency Management, and the forward site at the World Trade Center from Latham (figure 4-8). Liaison Officers were used to coordinate the state-level responses. In addition, direct liaisons were provided from the task force in the city for the direct work to be done between the supported agencies and the National Guard support on site. Initial missions and tasks identified were security, debris removal, logistics, and our own sustainment and mission support. A stand-by security force, the 27th Infantry Brigade was established at Syracuse, New York, in the event of any follow-on requirements. At this point in the operation, nobody had any idea if the attack on the World Trade Towers was it, or if another attack would follow.

All five New York air bases supplied civil engineering support for the sustainment of deployed forces at troop locations (figure 4-9). All bases

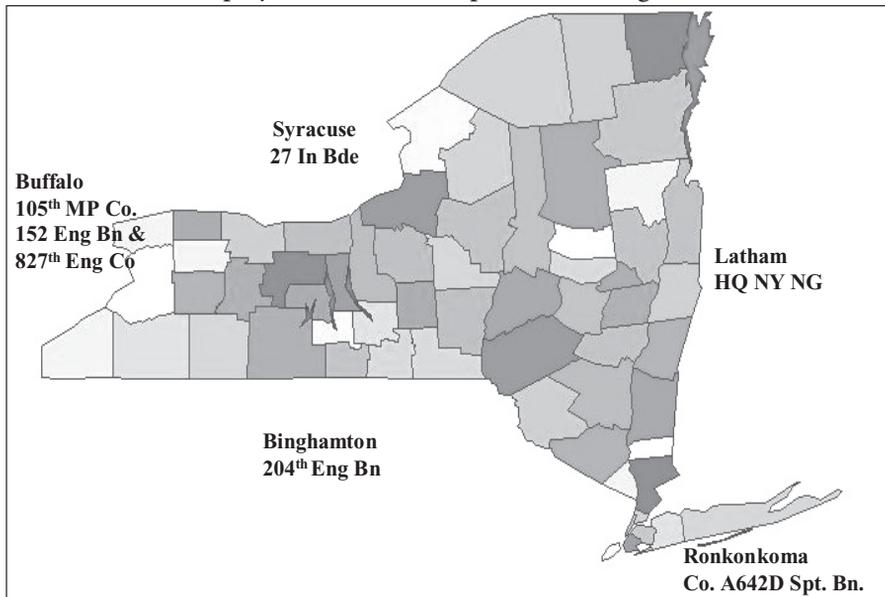


FIGURE 4-8: INITIAL NEW YORK STATE RESPONDERS

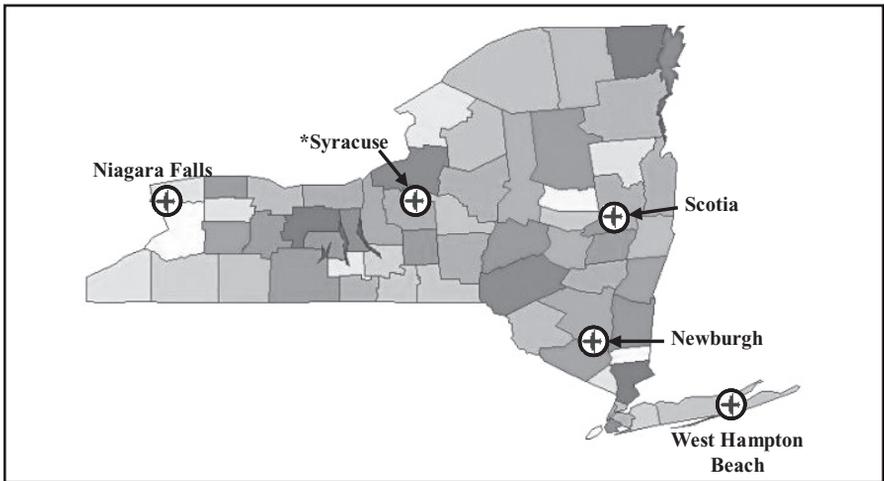


FIGURE 4-9: INITIAL NEW YORK STATE RESPONDERS (AIR BASES)

performed federal mission responses as well. The 174th Fighter Tactical Wing (F-16) was among the units providing tactical air coverage over New York City and over various other northeast cities in the United States.

Figure 4-10 indicates the primary troop locations, as we staged them and moved them into the city. The last three, Randall’s Island, Governor’s Island and Battery Park, were the focus of the Air Guard Civil Engineer unit’s support. Force protection levels impacted our choice for primary troop locations; these locations were used because they provided adequate security. We could not move soldiers and airmen into New York City and set them up in hotels. There was no effective way we could provide security for them at the force protection Delta level.

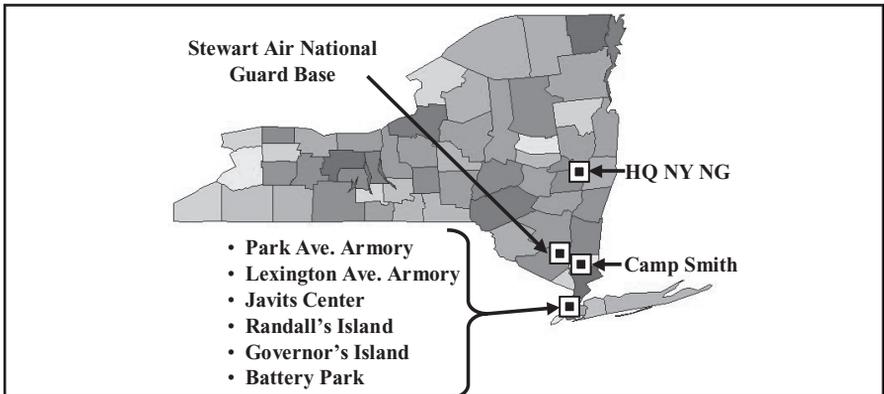


FIGURE 4-10: PRIMARY TROOP LOCATIONS

The immediate missions assigned included site security at ground zero and escort. What I mean by escort is, as the area was cleared of debris, family members needed to get back in, during the first couple of weeks of the operation, and retrieve personal belongings, take care of pets, and a number of similar needs, so we were tasked with the mission of escorting these people inside the controlled areas, taking them to their homes and bringing them back out. Relief donations became a big impact. The amount of donations that came into the city, even items that were not needed, was just overwhelming. We worked with several local agencies, including the American Red Cross and Salvation Army to establish storage areas, haul these supplies to the storage areas, and set up a process of accounting for all the donations coming in. As I mentioned before, the calming presence was among the focal points of why the Guard was down there. Public appreciation was overwhelming towards National Guard soldiers. One of our other missions, near the World Trade Center (WTC), was to assist a major United States Postal Service distribution center. The National Guard helped the Postal Service move the operation from the damaged location to another U.S. Post Office nearby. Force sustainment and civil engineering support were constant both for us and the support to the actual operation.

As time passed, follow-on missions developed. A large number of visitors were coming into the city, so a protocol cell was established to escort visitors throughout the city, including visits from the President of the United States and several other government agencies and military visitors. Military and police support in New York City expanded beyond the immediate area. The National Guard began working pedestrian foot patrols and traffic control areas around the larger site access control area, which included the southern half of Manhattan Island. As an access control plan was developed, the Air Guard was tasked with setting up the credentialing process so that everybody in and out, could be identified and access controlled. Because the WTC site was legally considered a crime scene, it had to be treated as a crime scene, our engineers were involved in tagging and removing of debris, and establishing the debris as it left the site as potential evidence. After the New York City Emergency Management Office was set up and moved to Pier 92, we were tasked with providing security for that site.

As time went on, the missions continued to further develop and other mission support tasks came into play, missions beyond just the WTC site. The Governor tasked the National Guard with additional missions, requiring the use of the 27th Brigade Task Force, which was placed in reserve at Syracuse, New York. The 27th Brigade was tasked to provide airport security as the mission requirement began in New York State in early October. The Brigade was tasked to protect the four nuclear power plant sites in the State of New York. Mission sites in New York City expanded to cover all of the tunnels, rail stations, and bridges in the city. The Civil Support Teams continued to provide site assistance, monitor air quality at the World Trade Center site, and when the anthrax attacks occurred, the team assisted Wadworth's Laboratory in New York by conducting tests on various letters and types of mail that had to be delivered that had potentially been contaminated with anthrax. As time passed, the need for Crisis Incidents Stress Management Counseling (CISM) and medical support for soldiers increased. The soldiers on duty in the city were seeing some of the most extreme cases of human disaster that you can imagine. As soldiers pulled debris from the ruins of the World Trade Center, body parts were found. We were concerned for our soldier's ability to deal with the stress of this situation. CISM teams were brought in to assist and to ensure that each soldier's needs were adequately taken care of. The burials of many of the firemen and policemen who were lost and several of the civilians who worked in the World Trade Center became a major issue. We provided Military Honor Guard details to support the burial services.

Additional missions New York received as a result of federal mobilization, that were going on at the same time in support of Operation NOBLE EAGLE included, providing security at the U.S. Military Academy at West Point, security at Fort Drum, northern New York border security, and enhanced security for U.S. Customs. The installation security missions are continuing today with the continuation of NOBLE EAGLE II mobilizations.

We provided security for 19 airports in New York City and additional locations throughout the state with about 380 soldiers (figure 4-11).

The protection of the State's nuclear reactors was a significant mission and is still going on today. Figure 4-12 is a map that shows the locations

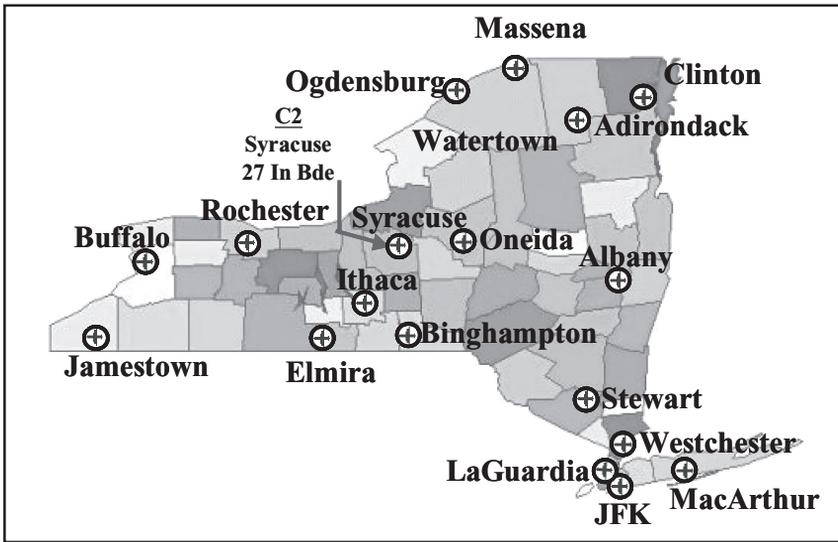


FIGURE 4-11: NEW YORK NATIONAL GUARD AIRPORT SECURITY SITES

of the nuclear reactors we are protecting. The Indian Point Nuclear Plant, which is close to New York City, is a major concern.

As a result of the 9/11 coordination, New York State signed into law, the Emergency Management Assistance Compact (EMAC), which the State did not have prior to this event. EMAC allows direct coordination with other states to bring in additional assets and provide for reimbursement from state to state. One of the things we utilized

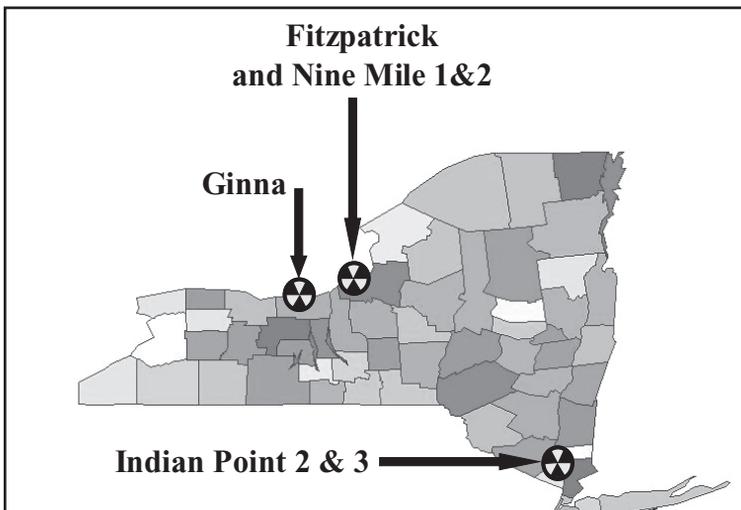


FIGURE 4-12: NEW YORK NATIONAL GUARD NUCLEAR REACTOR SECURITY SITES

EMAC for was the CISM counselors. After using available State resources, the State requested additional support from two neighboring states, Pennsylvania and Rhode Island, to bring in additional CISM counselors from their Air Guard units.

Some of the key lessons learned are as follows:

- a. Clear, concise, and current domestic standing emergency operating procedures. At the time the operation started we were revising and redrafting our domestic emergency response plan in the state. The emergency response plan ties together with planning and rehearsing interagency operations. Since we had just rewritten the plan, we had not had the opportunity to rehearse it. But, without the draft, it would have been impossible to operate and keep everybody on the same sheet of music.
- b. Requirement for written operations orders. When the operation began, things were very fast-paced, and most of the staff were traveling and not at the headquarters building. In the interim, until we got things rolling, a lot of verbal instructions were provided. This is not a good way to do business. We managed to get through this initial phase and began the process of written operations orders and continued on. It is important to note, even in the beginning, instructions should go out to the field in writing. I mentioned that we identified logistical staging bases early. This is something we did, and we did it well. It was placed in the lessons learned as something to remember to do again the next time.
- c. As previously noted, communication assets were pushed forward in the beginning. Very important. It was totally impossible to communicate with OEM when this operation started. Without the use of the 274th Air Support Operations Squadron and the communications assets provided from the state headquarters, we would not have been able to talk with our forward forces in effective time frames. Another key point is the need for an adequate support staff. Often in a crisis, there is total focus on the response without consideration for the peripheral requirements. Staff personnel such as Chaplains are important from the beginning and should be included in mission planning from the start.

d. Lastly, the joint operations center is the centerpiece. It is very important, at all levels, whether it is at the state headquarters level, or at the operation center at the tactical level or in conjunction with the civil authorities, that information flow through one common control point, it is crucial to keeping everybody coordinated so that everyone is on the same sheet of music. Without that, you are going to increase the “fog of war” and you will not be able to clearly understand what everyone else and other agencies are doing.

Application of Remote Sensing to Environmental Hazard Mitigation

Dr. Michael Foose
Regional Specialist for Africa and the Middle East
United States Geological Survey

It is a great pleasure to have this opportunity to talk about the applications of remote sensing to environmental hazard mitigation. At the onset, I would like to comment that one usually think of disasters as a short-term and rapid event such as an earthquake, volcanic eruption, or fire. However, many disasters are, in fact, events that develop over a protracted period of time. Some examples might include the contamination of critical groundwater resources so that vital water supplies are no longer available, land subsidence that damages critical infrastructure, or land degradation that changes the ecosystem or agricultural productivity of regions. This presentation will discuss both short- and long-term hazards. It will also focus on remote sensing using satellite imagery but it will also provide some examples of the use of other remote sensing tools.

It is also important to stress that this contribution presents a United States Geological Survey (USGS) perspective on the subject of environmental hazard mitigation. The USGS is part of the United State's Department of the Interior, a ministerial-level organization that has four main organizational units. The first of these is concerned with wildlife management and National Parks; the second is the Bureau of Indian Affairs and is concerned with the needs of indigenous peoples; the third administers public lands and the leasing of mineral and energy resources; the fourth organizational group is focused on water and science issues and is the group that contains the USGS.

The USGS is primarily a scientific agency that is designed to support U.S. land management activities. It works in four main areas:

1. Geology—including research on energy and mineral resources, environmental studies, and hazard mitigation efforts
2. Mapping—including the making of maps, working with satellite images, and the development of Geographic Information Systems (GIS)

3. Water—including work on both ground and surface water resources and water quality
4. Biology—including efforts to understand invasive and endanger species.

As an agency, the USGS primarily uses unclassified data in its scientific studies and is committed to making its scientific findings as publicly and widely available as possible.

With those introductory comments, I will now turn to the subject of remote sensing. To begin, I would like to consider the use of satellite imagery. It is important to state that, because there are so many different types of satellites, it will not be possible to discuss all of the available systems. Rather, the focus will be on the satellite systems that the USGS uses the most.

Not all satellites are created equal and the differences in their spatial and spectral resolution greatly control how satellite imagery can be used. The concept of spatial resolution is fairly straightforward and is illustrated in figure 4-13. Some systems, for example, have a spatial resolution of about .5 meters. Their images clearly show individual trees and houses. Images from systems that have a 10 m resolution show many of the same features, but individual trees, for example, can no longer be seen even though houses are more or less identifiable. In contrast, none of these features can be recognized on images from satellites with a resolution of 80 m.

In the same way, satellites also have spectral resolution. The human eye sees only a very narrow part of the electromagnetic spectrum. The spectrum extends beyond that visible to humans to the longer wavelengths

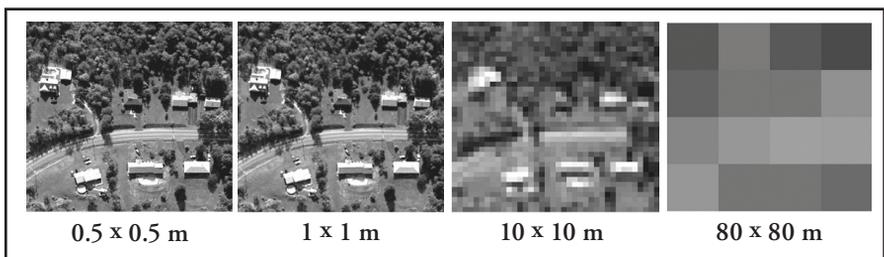


FIGURE 4-13: SPATIAL RESOLUTION

of the infrared and radar and to the shorter wavelengths of the ultraviolet. Most satellites can look at a large part of this spectrum, but not all satellites can see these parts of the spectra with the same resolution.

As figure 4-14 shows, multispectral satellite systems typically sample the electromagnetic spectrum with relatively few bands or channels, and often these channels are often quite broad. The Landsat satellite provides a specific example where the 4 main bands of the Landsat satellite are relatively broad and thus lack detailed resolution. In contrast hyperspectral systems sample the same part of the electromagnetic spectrum with many high-resolution bands. In general, the higher the spectral resolution, the better one can discriminate features on the ground. Hyperspectral systems will be discussed later.

I would now like to cover examples of how satellites may be used. In general, I will discuss the most straightforward uses of remote sensing first before treating more complicated remote sensing applications.

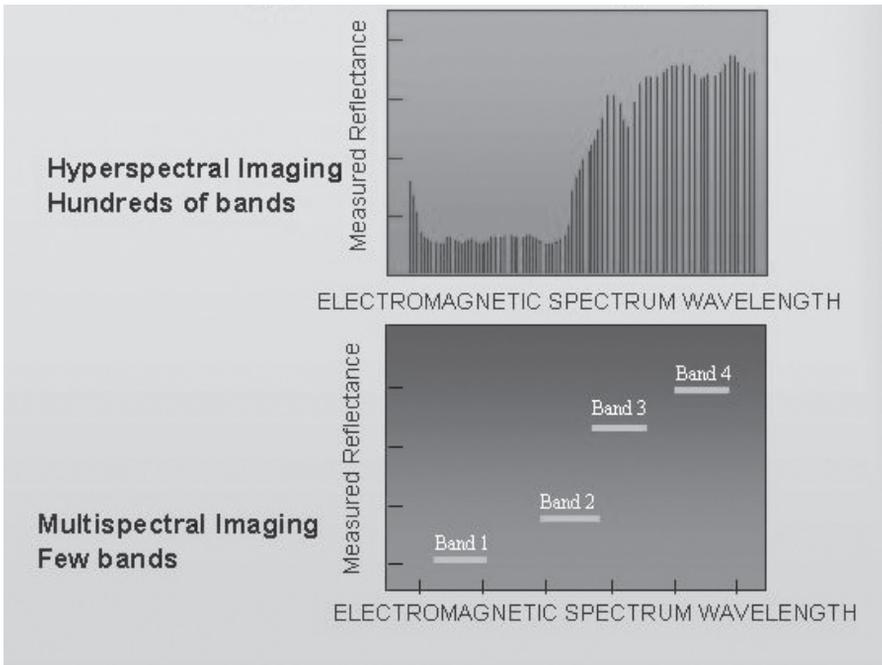


FIGURE 4-14: ELECTROMAGNETIC SPECTRUM—HYPERSPSCTRAL AND MULTISPECTRAL IMAGING

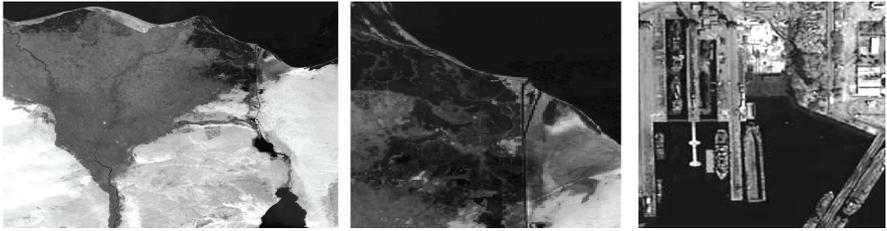


FIGURE 4-15: SATELLITE IMAGE OF THE NILE DELTA

The first and foremost application of remote sensing imagery is to put a situation in its regional context. Figure 4-15 shows an example in which a satellite can provide an image of the entire Nile Delta. With more detailed imagery, one may zoom in on any part of the delta that might be of interest. With some systems, it is even possible to view specific areas with meter-scale resolution. This ability to view features at meter-scale detail exists with a number of different satellite systems, including those providing commercial imagery.

One of the most common systems used by the USGS is the Advanced Very High Resolution Radiometer (AVHRR) system. This system has a very coarse spatial resolution—about 1 km and very low spectral resolution. It has only 5 channels. However, it provides daily coverage of the entire globe and thus is extremely useful in continuously monitoring large features. For example, this satellite is commonly used to monitor weather systems. Figure 4-16 shows the AVHRR satellite is being used to track a large hurricane that is impacting Central America. Using images of this type, disaster managers are able to accurately track such storms, see where the storm is most intense, and determine what areas are being most adversely affected. This information can be immediately used to direct disaster response.

The AVHRR system is also used by the USGS to monitor volcanic eruptions. In 1989, Royal Dutch Airlines (KLM) flight 867 flew into the volcanic ash plume caused by the eruption of the Redoubt volcano in Alaska, USA. The ash was sucked into the jet engines and caused them to fail. The plane fell over three kilometers before the pilots were able to restart 2 engines and save the aircraft. As a result, the USGS was asked to begin a volcano-monitoring program that would identify erupting volcanoes. Currently, the USGS has a center devoted to monitoring the

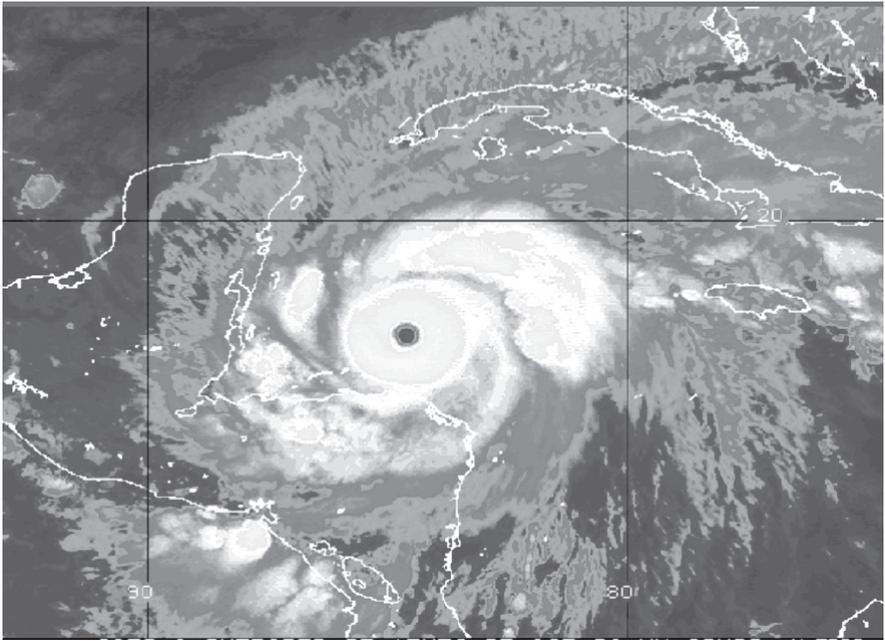


FIGURE 4-16: AVHRR IMAGE OF HURRICANE APPROACHING CENTRAL AMERICA

location of ash plumes and then provide warnings to aircrafts so that they can avoid areas where volcanic ash might be present.

AVHRR also provides imagery from its infrared bands and these can be used to look for and locate wildfire. During this past summer, many large wildfires burned in the western United States. Fire response managers used thermal images to identify the most serious fires which, in turn, helped them better allocate the available resources to fight these fires.

The Landsat satellite is another system widely used by the USGS. In fact, the USGS owns and operates the Landsat system. Various Landsat satellites have been flying for over 30 years. Landsat has a much better spatial resolution than the AVHRR satellite. Most bands have a spatial resolution of about 30 m, but Landsat is still a multispectral system that has relatively poor spectral resolution.

Landsat is commonly used to monitor changes on the land surface. For example, the USGS is part of a team that is trying to control the spread of water hyacinth that has invaded parts of Lake Victoria and has damaged important fisheries. In this case, Landsat is used to monitor

the distribution of this invasive species and assess the effectiveness of remediation efforts. Further, because Landsat has been flying for so long, it is also possible to use it to look at land use changes over more than twenty-five years. As an example, Landsat images have been used to show the change in Mesopotamian marshlands. Images from 1973 show that wetlands extended over large parts of eastern Iraq and parts of Iran. However, images from 2000 show that most of these wetlands have now disappeared.

So far, the examples cited have basically shown how satellite imagery can be used as pictures. These pictures, however, can have an even greater use if they are converted to maps and used as part of a geographic information system (GIS). The conversion from a picture to a map is done by registering each pixel of the satellite image to a specific point on the ground.

An example of how addition of imagery to a geographic information system can be used in disaster planning is shown by some recent work in Central America associated with Hurricane Mitch. In 1998, a large and powerful hurricane devastated much of Central America. Subsequently, the USGS and other agencies worked to develop a GIS that could help mitigate similar devastation in the future. One of the first steps was to use imagery to locate critical infrastructure and to put this information into a GIS. Also added to this GIS was a detailed digital elevation model of the region. With this information, it is possible to model which critical infrastructure will be flooded under different weather conditions. Figure 4-17 shows some of the results of this modeling. A result of this GIS system is that planners are now able to predict the impacts of flooding before it occurs which, in turn, gives them the ability to plan how to mitigate the impact before a crisis is upon them.

The Famine Early Warning System (FEWS) provides a second and more complicated example of the use of GIS and satellite imagery in disaster planning (figure 4-18). FEWS is a multi-agency undertaking in which the USGS is partnered with United States Agency for International Development (USAID), National Oceanic and Atmospheric Administration (NOAA), and National Aeronautics and Space Administration (NASA) to use several different satellites, computerized meteorological forecasts, normalized difference vegetation index (NDVI),

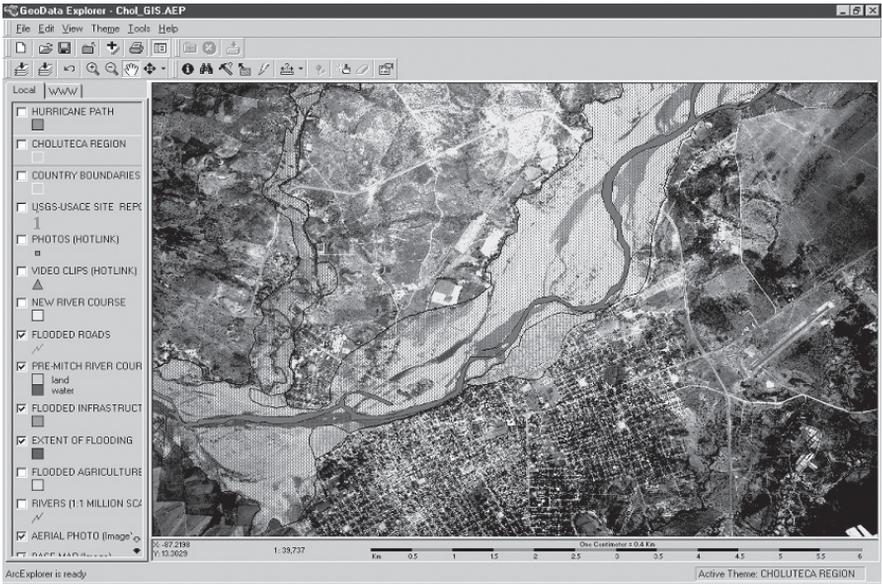


FIGURE 4-17: CRITICAL INFRASTRUCTURE EFFECTS MODEL

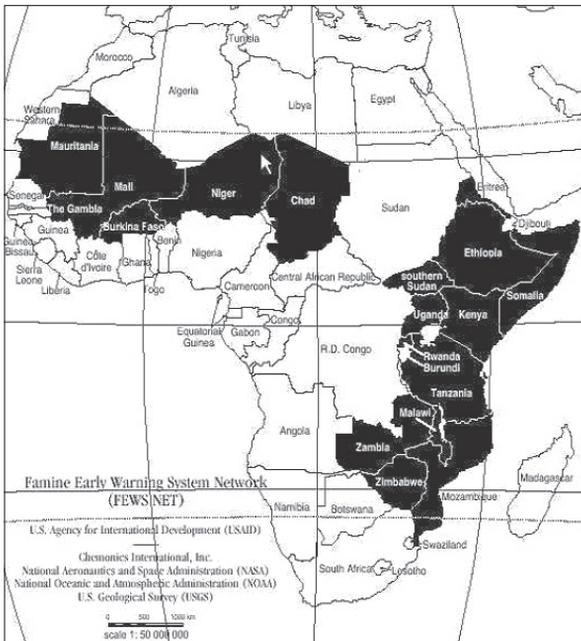


FIGURE 4-18: FAMINE EARLY WARNING SYSTEM (FEWS)

greenness index, and on-the-ground-monitoring to look at the health of crops over much of Africa. The system has the ability to identify areas where rainfall is below normal and where crop failures are likely to occur. The system is used to issue warning about potential famine and is used to focus assistance efforts on the areas that have the greatest need for food. The FEWS effort is a large one that involves the partnership of 17 African countries. One of the important themes that should be stressed by this work is that regional cooperation is often very important when trying to work with regional environmental hazards. In this case, FEWS would not be possible without the partnership of these countries.

So far, this discussion has focused only on multispectral satellites. However, some of the newer hyperspectral remote sensing systems provide much greater spectral resolution. One of these is the Aster system. Aster has a 30 m spatial resolution and 14 channels. Landsat, in contrast, has a 30 m spatial resolution and 7 channels. A result of this increased spectral resolution is an increased ability to distinguish features on the ground. In biological studies, for example, Landsat images have been shown to be able to distinguish soft woods from hard woods from grasslands. However, an Aster analysis of the same area can distinguish individual species of plants. For example, red oaks can be distinguished from maples, or from spruce. This increased discrimination is used for the environmental monitoring of various types of invasive species.

The same type of hyperspectral capability can be used to map different types of minerals on the earth surface. This type of minerals mapping is extremely useful in the geological prospecting for some types of gold deposits. It can also be used in hazard mitigation. As an example, some volcanoes in the western part of the United States have large areas of highly altered rock. These rocks have very little strength, and where they occur on steep slopes, they may shear and cause landslides. These altered rocks, however, can be relatively easily mapped by some hyperspectral systems and these systems are used to make hazards map which identifies areas where landslides are likely. These maps, in turn, are used to help protect large urban areas down slope from these possible landslide areas.

Earthquake hazards provide a good example to make the point that not all remote sensing involves satellites and imagery. The map in figure 4-19 is part of a recently published global seismic hazards map, and it



FIGURE 4-19: ARABIAN GULF—EARTHQUAKE RISK AREAS

shows that the eastern part of the Gulf region (the darkest shaded areas) is at substantial risk for large damaging earthquakes. In fact, Tehran is probably one of the most at-risk cities in the world for earthquake damage. In contrast, the western Gulf generally appears to be at relatively low risk for earthquakes, but there was a magnitude 5.1 seismic event in the United Arab Emirates (UAE) in March of 2002. Further, it is very possible that large seismic event along the eastern margin of the Gulf may cause substantial damage to infrastructure along the western margin. What role does remote sensing have for earthquakes?

The principal remote sensing tool is not a satellite, but a seismometer. This is an instrument that is placed in the ground and which, by itself, can give information on the intensity of seismic events and the frequency of the seismic waves. When integrated into a larger network, these seismometers can also be used to triangulate on and locate earthquakes. Good information about the frequency and intensity of earthquake events and the precise locations of earthquakes are necessary to accurately evaluate the seismic risk. For this reason, regional cooperation is important.

For more than ten years, the USGS has cooperated with the United Nations Educational, Scientific, and Cultural Organization (UNESCO) to promote regional cooperation for seismic hazard mitigation in the Middle East region. This large undertaking has involved the cooperative work of more than twenty countries. This effort focuses on two issues. The first is better data exchange and calibration so that the frequency, intensity, and location of seismic events can be better determined. The second focus is on the methods that can be implemented to mitigate these hazards. Once again, it is important to restate that confronting regional hazards of this type is best accomplished through programs that promote regional cooperation.

There are, however, some satellite systems that can be used to work on earthquake hazards. The principal tool is radar interferometry. With this system, a radar satellite locates the precise position of a point on the earth's surface during an initial pass. At a later time, perhaps after an earthquake, it relocates that same point. Computers are used to make a comparison of the two locations and to measure changes in position that may only be a few centimeters large. Mapping these changes allows one to monitor movements that may be caused by land subsidence, volcanic eruptions, or earthquakes.

An example of this type of mapping is shown figure 4-20, which shows an area that has just experienced an earthquake. The earthquake was localized along the geologic faults shown in white. The shaded bands show the displacement along the faults. Shaded bands that are close together indicate areas of large displacements, while broader bands show areas of relatively little change. Thus, one can easily identify areas where the largest displacements have occurred and where damage has probably been greatest. One can also identify the zones between large displacements and relatively little movement. These are often the areas where after shocks are focused. Knowing the location of these zones thus can be useful to minimize subsequent damage from aftershocks. These interferometric maps, therefore, provide a tool both to understand how and why damage has occurred, how damage can be mitigated in the future, and what areas may be at risk for future seismic event.

Interferometry can also be used to monitor other types of land movements. Studies around the U.S. city of Los Angeles shows areas of

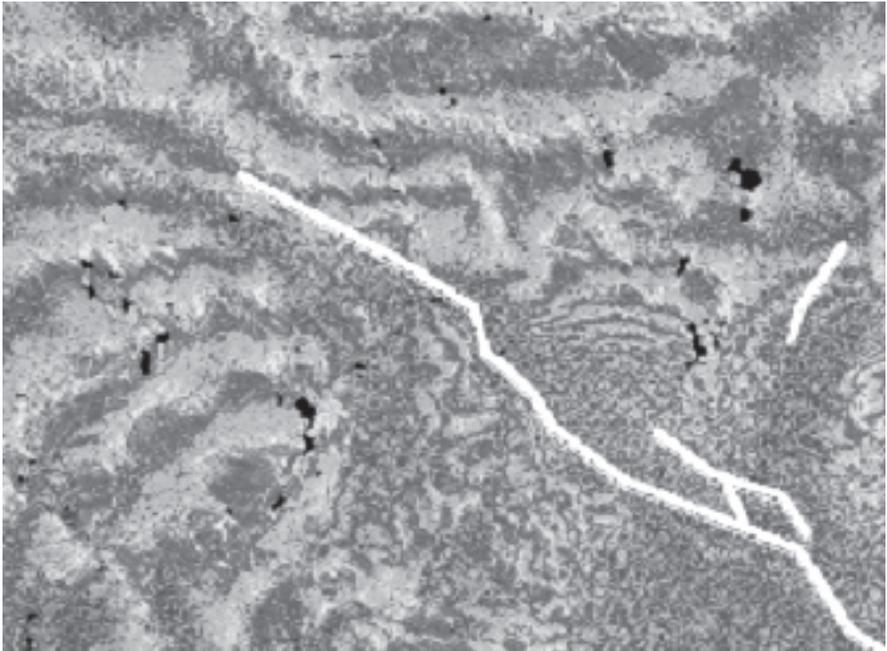


FIGURE 4-20: EARTHQUAKE DISPLACEMENT INTERFEROMETRIC MAP

substantial land subsidence due to the withdrawal of hydrocarbons and as a result of the withdrawal of ground water. Subsidence of this kind can threaten critical infrastructure; interferometry provides a useful tool for monitoring subsidence and for planning how to avoid subsidence-related losses.

A final use of radar imagery is to locate and monitor oil spills. The difference in reflectivity between oil and seawater enables oil slicks to be located with radar. A number of countries are using this tool to locate and track oil spills and to anticipate their impact on sensitive coastal areas. For example, monitoring these spills may be extremely useful in protecting the integrity of desalinization plants that.

The final topic that will be discussed is the use of remote sensing tools in groundwater development and protection. Like many parts of the world, groundwater is important for people living in the arid parts of the southwestern United States. Around the city of Albuquerque, New Mexico, groundwater is taken from unconsolidated sands that fill a basin made by hard rocks. Airborne magnetic data have been used to make a detailed map of this basin. On this type of map, one can see not only the

shape of the basin, but also the location of sub-basins and geologic faults that cut the basin. Additional mapping with airborne electromagnetic systems allow one to measure the grain size of sands that fill the basin and how they change throughout the basin. In turn, grain size greatly effects the distribution of water within the basin. When combined with the airborne magnetic data, these remote sensing surveys provide extremely important information about where the water is located, how much water is present, and they help in the making of models of how that water can be withdrawn in a way that does not destroy the water resource.

Finally, the USGS is using airborne electromagnetics to protect critical freshwater resources in some coastal areas. Withdrawal of freshwater in coastal areas can cause saltwater to move towards the land with the result that freshwater wells may become salty and ultimately unusable. The contact between salt and freshwater can be mapped with the airborne electromagnetic system. In Florida, for example, the saltwater contact can be very accurately located and monitored and, in this way, freshwater pumping can be controlled so that saltwater intrusion does not threaten freshwater supplies.

In summary, remote sensing can be a vital tool for environmental disaster monitoring, disaster response, and disaster mitigation. First, satellite imagery provides the context in which to view a disaster. Additionally, when used as part of a geographic information system, satellite imagery can be part of a powerful analytical tool to predict disasters and to monitor disaster response. This presentation has also attempted to show how remote sensing can be used to mitigate a variety of different types of hazards which include flooding, volcanoes, landslides, earthquakes, ground subsidence, and the destruction of groundwater resources. Finally, it is important to once again stress that regional cooperation can greatly increase the effectiveness of efforts to monitor and mitigate environmental problems that have a regional extent.

Information Exchange and Management Tools: Partnership for Peace Information Management System (PIMS) and Defense Environmental Network Information Exchange (DENIX)

Ms. Jackie Hux Cain
Technology Team Incorporated

Good afternoon. The main issue that I want to address is how to keep up-to-date on environmental, safety, and occupational health issues (ESOH), using information exchange tools. My primary goal is to demonstrate a very successful information exchange system that is currently used within the U.S. Department of Defense (DOD). I will cover several areas: what is an environmental, safety, and occupational health information exchange tool? Why use one? What are the information areas, as well as capabilities? Afterward, I will proceed to the demonstration.

What is an ESOH information exchange tool? Currently, it is a worldwide web site that serves as a central communications platform, that facilitates the exchange of information and the dissemination of information between the U.S. Department of Defense, federal and state agencies, international governments, and the general public. It includes valuable information resources and a customized communication capability that facilitates collaborative development.

Why use information exchange tools? The number one reason is to share information—to share lessons learned and to exchange information. Other relative points are to increase your effectiveness—the tool provides access to information at your desktop—to reduce costs, to eliminate redundancy, to centralize data, to stay current with news and events, and to access the latest information. It also provides the mechanism for you to interact with ESOH professionals: a platform for asking questions and for disseminating information, reports, and so on. The tool also allows users to customize working group areas that facilitate continued collaboration after meetings, such as this one, have taken place.

Among the more valuable information resources are newspapers and publications. These are provided in a central location. A few of the subject area pages are soil conservation, hazardous substances, occupation

safety and health issues—which we’ve heard all about today—pollution prevention, waste, and water. Also, provided are policy indexes across all services. For example, DOD directives and instructions, Army, Navy, Air Force regulations, as well as federal legislations and regulations, public laws, etc. All this information is available electronically. A few items are custom capability tools, for example, the first items are work groups and conference support mechanisms. This capability allows you to post meeting minutes, agendas in advance, briefings, and proceedings from events such as this. This tool allows you to share this information with your colleagues. A key point is the discussion forums on various ESOH topics. Again this allows you to communicate worldwide with other professionals on a particular topic.

I would like to talk about information exchange, information resources, and a system that facilitates the exchange of that information amongst our colleagues worldwide. That system is called Partnership for Peace Information Management System (PIMS). I will explain what PIMS is and focus on the information areas and capabilities that are available through PIMS.

PIMS is a system designed to store, manipulate, and disseminate all types of data applicable to the Partnership for Peace (PFP) community within a dedicated, secure intranet. PIMS facilitates the collaborative development and sharing of information among participants day to day as well as through Information Technology support for conferences, workshops, and exercises.

The PIMS mission is primarily to strengthen U.S. partner relations and the Partnership for Peace program through a cooperative development effort employing dedicated communications and information technologies that establish a common infrastructure supporting both collective cost avoidance and interoperability.

PIMS has over 4,600 account holders in fifty-seven countries. Seventeen Partner Nations have been loaned PIMS equipment, (satellite terminal, server, and personal computers) providing communications among ministries, military headquarters, defense academies, and military hospitals. We also have eight partner nations who provide their own equipment.

For example, in the U.S. Central Command Area of Responsibility (AOR), there are four Central Asian partners with loaned PIMS equipment installed: three have local hires assigned. Systems in Armenia, Azerbaijan, and Tajikistan were installed in June 2002.

PIMS is primarily an infrastructure established in each of your countries to facilitate communication and the exchange of information. However, I would like to focus on the information that is available on the system.

The actual PIMS website is www.pims.org. PIMS is a password-protected system. This allows partners to conduct collaborative development and talk to each other without worrying about the general public coming into that system. Presentations, information, conferences, and exercise information are available on this site.

PIMS facilitates the twenty-three Partnership for Peace areas of cooperation. They include civil emergency planning, crisis management, medical, and military geography among others. The Department of Defense has added several additional areas to the twenty-three NATO/PFP topic areas. One area of interest is the Installation and Environment area of cooperation. In this particular case we identify environmental, occupational health, atmospheric indicators, and safety information available for PIMS users. We do this in cooperation with the Office of the Deputy Undersecretary of Defense (Installations and Environment) and provide that information.

Within PIMS there is a key area called U.S. DOD documents, which is provided from a system called the Defense Environmental Network Information Exchange (DENIX). This system is for the Department of Defense and its partner countries. It provides a place for all installation and environmental information. We have partnered with the PIMS program to provide excerpts of those documents to you in the Eastern Hemisphere. We have moved some of the documents over to Belgium to allow you to obtain access to the document in a timely manner.

DENIX is very heavily used. We had eighteen million hits last year. By partnering with PIMS we are allowing access to the information in DENIX. I would like to point out we have clean up, compliance,

conservation, hazardous materials, pollution prevention, and unexploded ordnance, UXO. This type of information is provided to you, and we would like to hear from you as to what other topics and information we should provide.

Within PIMS, there is a hazardous management site, an environmental handbook for deployment, and a disaster response and consequence management website. There are gateways to related topics, such as this conference.

Not only does PIMS offer a vast resource of information, documents, and projects that are being co-developed with partner countries, it also provides different capabilities for the partner's use. We have an area called work groups that allows you to cooperate with your partners, whether it is within your office, with the next country, or among a larger group. We also provide a search engine and the ability to provide feedback to PIMS and DENIX. The system is free for our partners.

Today and tomorrow afternoon I will conduct two training sessions. You can learn more about the system's capabilities and establish a PIMS account if needed. I have just touched on installations and environment. There are many other categories in PIMS that may relate to information for which you are looking

CHAPTER V

COOPERATION BETWEEN DEFENSE AND OTHER AGENCIES

Introduction

Rear Admiral (Retired) John F. Sigler
Near East South Asia (NESAs) Center for Strategic Studies
Moderator

As we move closer to the workshops that will build upon the work started in Oman in 2000, we have seen some common threads in our discussions so far on Environmental Security. First, events can occur in our environment, whether natural or man-made, that can have a significant impact upon national and regional security. Second, prior planning, preparation and information sharing are absolutely critical to having an adequate response. Finally, because of our unique capabilities, militaries have a valid role in preventing where possible, and responding where necessary, to environmental crises. Sometimes the military will be in charge, with multiple other agencies involved. Quite often the military will be supporting the other agencies, both governmental and non-governmental, that are responding to the crisis. This panel further addresses this last point. In prior planning, preparation and execution, coordination between military and civil organizations is critical.

Initial Reactions: Coordinating with the First Responders

Brigadier General Craig T. Boddington
United States Marine Corps
Commander,
Joint Task Force – Consequence Management, Kuwait

Thank you, Admiral. Good morning, ladies, gentlemen, and distinguished guests. It is a great honor and privilege for me to be here today, and I want to offer a special thanks to the many of you here that were involved in organizing and orchestrating this great conference, and especially our friends and colleagues from the Qatari Armed Forces. This is a wonderful opportunity for all of us.

This morning I am going to discuss how a nation might react to a chemical, biological, radiological, nuclear, or high explosive (CBRNE) incident, as well as how my task force might fit into the response. Consequence management is defined as, “the measures taken to protect public health and safety, restore essential government services, and provide emergency relief to governments and individuals affected by the consequences of a CBRNE incident,” These are the functions that may have to be performed, depending on the nature of the event:

- Decontamination
- Emergency Medicine
- Fire Fighting
- Search and Rescue
- Food and Water
- Communications
- Transportation
- Healthcare Services
- Displaced Civilian Services
- Clothing and Shelter
- Information and Planning
- Public Information

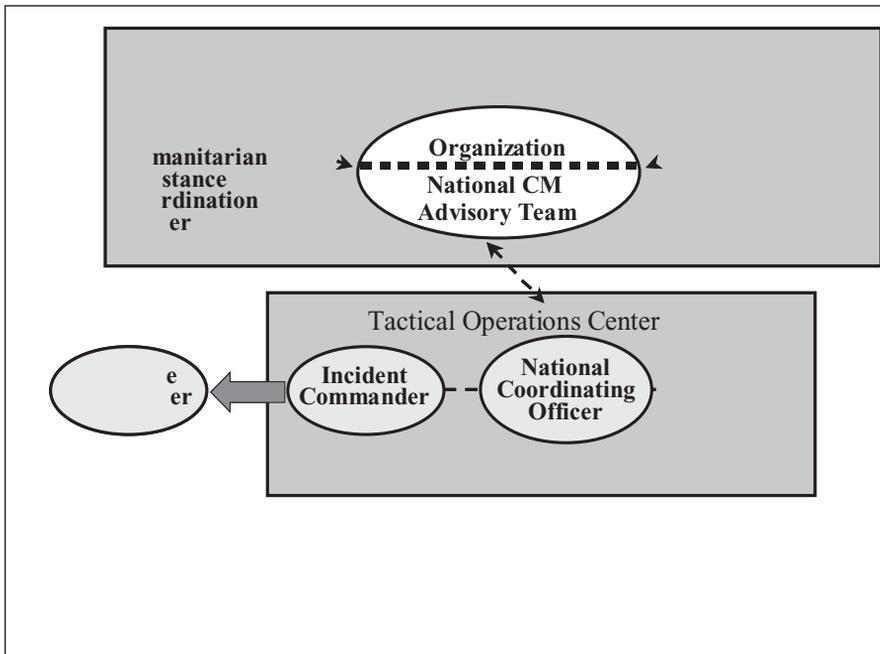


FIGURE 5-1: TYPICAL HOST NATION RESPONSE

These functions are essentially the affected nation's responsibility to solve. The answers are probably not going to be easy, and international assistance may and probably will be required. Every event is different. Host nation capabilities to handle the consequences of an event differ not only from country to country, but also from town to town. Ideally, these basic initial response tasks need to be accomplished as quickly as possible. But it is likely that, in many, and perhaps in most areas the local authorities will be quickly overwhelmed, and will require assistance.

This is a graphic illustration of a typical host nation response scene (figure 5-1). Every incident is different and what a given nation might call these entities is going to vary.

You are going to have some kind of an incident. The Police and Fire Department personnel are normally the first responders to an incident. The police will set up a command post and the fire department will establish an entry and exit control point to the site. Both departments will begin an initial assessment of the site. Based on the initial assessment, the Scene/Site Commander may pass command and control to a higher authority within

the host nation. If the site is contaminated, the reconnaissance team will establish hot and cold zones to prevent the spread of contamination. At this time, medical treatment and decontamination efforts begin to transport casualties and evacuate personnel from the incident site. Close by the incident itself, there will be a tactical operations center (TOC), with an incident commander, and a national coordinating officer who is going to work with the national government. For any incident, the press is going to be there. So there is the need for an on-scene information center of some kind. At the national level, there is going to be a national operations center, with some kind of a consequence management national command group. Most countries will have a lead consequence management organization, perhaps one of the ministries or possibly another organization. Humanitarian assistance will be needed, so the TOC needs to establish a humanitarian assistance coordination center. Again, the press will be there. So you need a public affairs information center. And of course, this is going to vary from country to country.

Now let me talk about my organization. The Combined Joint Task Force Consequence Management (C/JTF-CM) is a U.S. Department of Defense organization, created by the U.S. Central Command (USCENTCOM), designed to reinforce a host nation's response. Although, we are a U.S. Department of Defense organization, the Department of Defense will probably not be the lead agency in most responses. The U.S. Department of State (DOS) will probably be the lead agency in most events of this nature. Now going back to the diagram that we looked at before, here is how we fit into the equation (figure 5-2). We reinforce a host nation's capability at the tactical level, and coordinate and assist at the national level. We will come in as the lead element of a U.S. Government response, with the U.S. Department of State as the lead agency.

What are our command relationships within USCENTCOM? The Joint Task Force works for the U.S. Marine Forces Central Command (MARCENT), who works for U.S. Central Command, and the JTF has a coordinating link to the U.S. Department of State in any given country. The Department of State has a consequence management (CM) support team that is tied in directly to the ambassador, with a coordinating link to us. I will talk a little about our capabilities. Right now, our coalition partners, the Federal Republic of Germany and the Czech Republic,

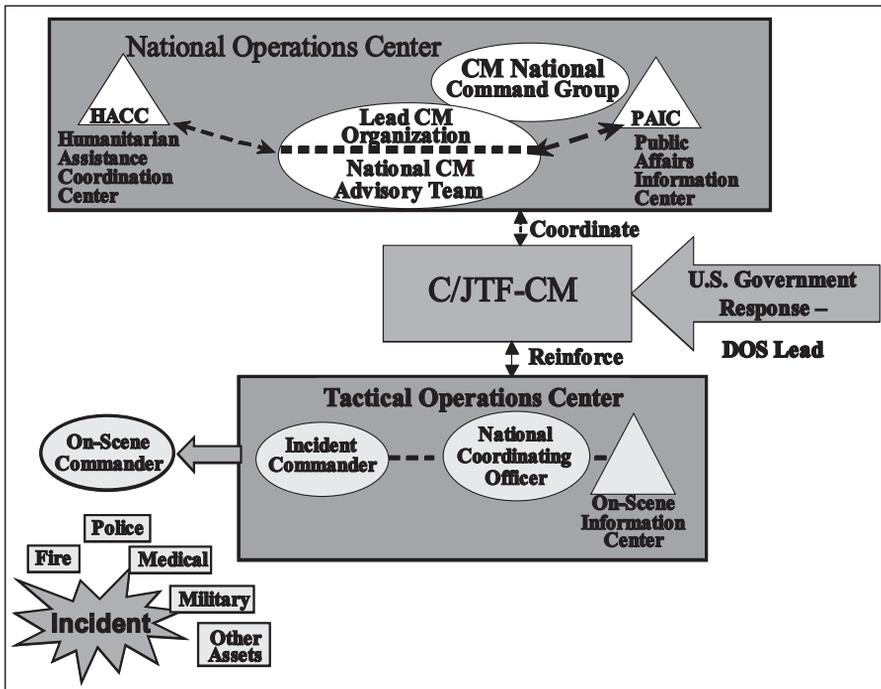


FIGURE 5-2: C/JTF-CM REINFORCEMENT

provide more than half of our capabilities and these are some of our basic capabilities that we have for an initial response (figure 5-3).

Some of our forces will respond from Kuwait, some are on 24-hour notice from within the U.S. CENTCOM Theater, and some are on a 96-hour notice to respond from outside this theater. The actual response time depends on the nature and location of the incident and availability

- Coalition/Joint Task Force (Czech Republic and German Forces are part of our Task Force)
- Command and Control of U.S. Government Response
- Integrate/reinforce HN Response
- Recon—What are we faced with?
- Search and Extraction of victims
- Decontamination of victims, personnel, and equipment
- Medical—Triage and stabilization
- Communications

of transportation. A liaison team (LNO Team) from the task force is the first echelon to respond to any incident. The LNO Team consists of an operations planner, logistics/transportation officer, contracting officer, medical planner, emergency services officer, U.S. Embassy LNO, and

FIGURE 5-3: C/JTF-CM CAPABILITIES

a communications officer. Some of the primary capabilities that our liaison team has are: provides initial liaison between C/JTF-CM, U.S. Embassy, and Host Nation response; integrates into host nation first response professionals, coordinates the follow-on response from C/JTF-CM with the U.S. Embassy and the Host Nation; and establishes liaison with international agencies. They are going to arrive and mobilize very quickly and start to obtain the information necessary for us to plan our force requirements and plan operations.

The next echelon to deploy is the forward command post. Ideally the forward command post will follow and arrive behind the liaison team within a matter of hours. The nucleus of the forward command post is the operations section, logistics/contracting/health services section, nuclear, biological, and chemical (NBC) experts, force protection element, limited transportation assets, coalition LNOs, communications assets, and a public affairs officer (PAO). Some of the primary capabilities that our forward command post provides are:

- Integrates into the host nation response at the incident site
- Begins the process of command and control of U.S. Government response
- Coordinates arrival of response forces
- Communication reach-back – Military and Department of State

They will begin more detailed planning and actual execution of the C/JTF-CM mission. Very critical in those early hours is communication reach-back, and coordinating the arrival of the response forces. The initial response force will follow the forward command post into the incident area (figure 5-4).

Some members of the initial response force (IRF) are included in the forward command post, handling planning considerations critical to the success of the mission. The initial response force is designed to be a full spectrum chemical, biological, radiological, nuclear and very high explosive response force. When we developed the IRF, it was developed along the lines of the sea berth model, which is a very successful Marine Corps-specific organization in the States. However, ours is very much

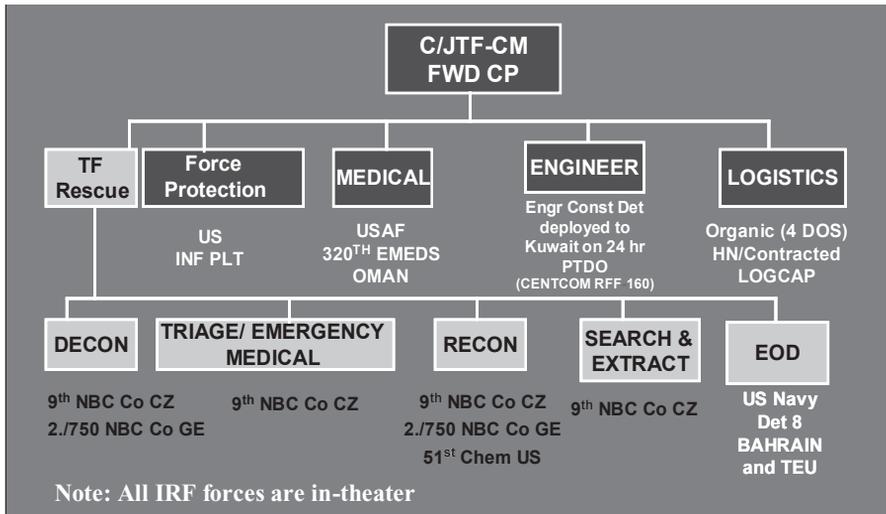


FIGURE 5-4: INITIAL RESPONSE FORCE

combined and very much joint. With Task Force Rescue, 85% of the troops on the ground in this part of our initial response force are going to be from our coalition forces, the Czech Republic and the Federal Republic of Germany. Our goal is to turn victims into patients.

The initial response force focuses on these portions of the consequence management spectrum. The IRF's first and foremost initial response is reinforcing a host nation's first responders. Now, in addition to the initial response force, we have a fairly extensive menu of forces that are on alert and prepared to deploy within 96 hours, who we call the Extended Operating Forces (EOF). One of the first things I would do on arrival is start looking at the situation and determine what items I need to order off of that menu, so that we can get our follow on forces properly organized and inbound.

Figure 5-5 portrays a very notional consequence management response timeline. Actual times are dependent on the type of incident. Of course, you start with an incident, and the host nation's first responders arrive and shortly thereafter, you might start to see an indication that you actually have a chemical or biological attack. As a result, the first responders will have to back off a little bit and set-up an incident site. The United States Ambassador will see that something terrible has happened. The Ambassador will call the Department of State and will

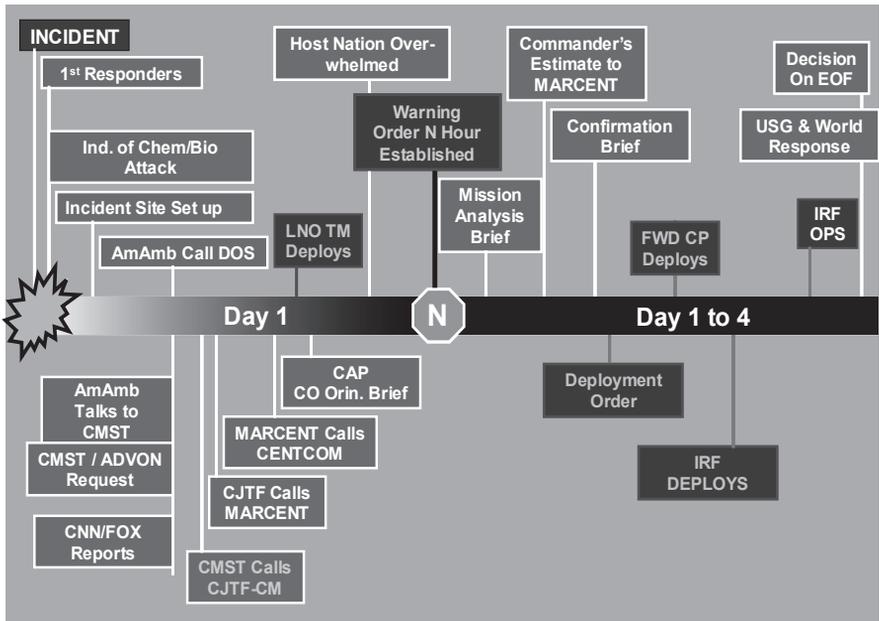


FIGURE 5-5: TYPICAL HOST NATION RESPONSE

talk to the Consequence Management Support Team. The Consequence Management Support Team's advance party will probably deploy to the incident area shortly thereafter. During the meantime, yes, the mass media is going to be reporting the incident.

The Consequence Management Support Team is going to call the C/JTF-CM. We have a direct line to the Support Team. The C/JTF-CM will call our higher headquarters, which will notify U.S. CENTCOM. The C/JTF-CM will begin crisis action planning, but in the meantime, the C/JTF-CM will request approval from U.S. CENTCOM to deploy our liaison team, and will try to deploy the team in a matter of hours. Somewhere in here, it is very, very likely that some of the host nation's emergency capabilities are going to be overwhelmed, and there will be a request for assistance. U.S. CENTCOM will issue a warning order to the C/JTF-CM, which actually establishes our notification hour (N-hour) sequence. We proceed with a mission analysis brief, a commander's estimate, following with a confirmation brief. Acceptance of the confirmation brief will generate a deployment order from U.S. CENTCOM, and we will deploy our forward Command Post (CP), followed by the IRF, and on arrival begin to conduct immediate response

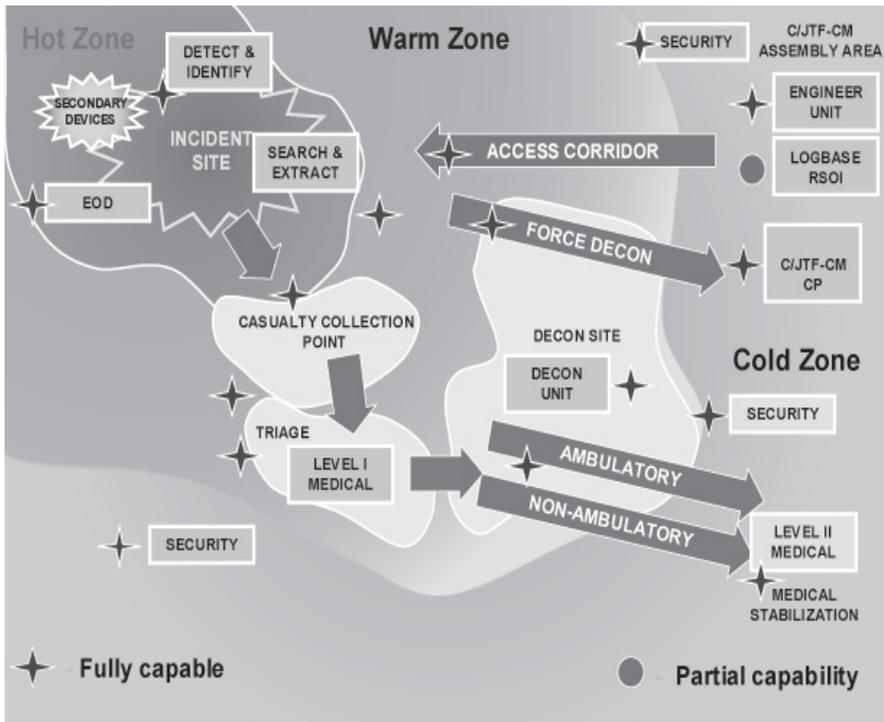


FIGURE 5-6: TYPICAL INCIDENT SITE

force operations to reinforce the host nation capabilities. One of the very critical things that is going to occur early on, is a decision on what part of my extended operating forces are going to be needed. This decision is essential, because it takes time to get them in theater.

This is a graphic depiction of a typical incident site, with a hot zone, warm zone, and cold zone (figure 5-6). The hot zone is the contaminated site. The cold zone is not contaminated. The warm zone is actually created by personnel and equipment moving out of the hot zone and bringing some degree of contamination with them.

When Task Force Rescue and the Forward Command Post arrive, the first thing we are going to do is establish an access corridor, and begin force decontamination. The C/JTF cannot send anyone into the hot zone until the decontamination site is set up to bring him or her out safely. With that done, the C/JTF will send in our reconnaissance forces to detect and identify the type of contamination. The reconnaissance force will establish the proper personnel protective equipment (PPE)

so the search and extraction crews can go in to evacuate the casualties. Explosive ordinance disposal may need to go in as well to search for secondary devices. While this is ongoing, we are setting up a much larger decontamination site for equipment, ambulatory personnel, non-ambulatory personnel, medical casualty collection point, triage area, and a stabilization area in the cold zone. Again, most of my forces that would go into the hot zone are coalition partners from the Czech Republic and Federal Republic of Germany.

The task force has a robust command and control capability to assist the host nation in coordinating all organizations, military or civilian, that respond to an incident. The C/JTF has the capability to conduct a thorough site assessment, in the military called reconnaissance. The Federal Republic of Germany and the United States Forces use Fox vehicles. The Czech forces use specially equipped Land Rovers and BRDMs. The C/JTF has a robust vehicle decontamination capability using Czech, German, and U.S. assets. Of course, victims also have to be decontaminated, to include ambulatory and non-ambulatory. Within the task force, we have limited medical capability. The C/JTF can assist with triage and limited stabilization, but have to rely on other sources for any major medical treatment.

In summary, we were stood up about a year ago. The C/JTF is the first and the only consequence management task force in the militaries of the world. We do not advertise that we have got it right, but we are off to a great start. Our headquarters unit is trained and ready to go. The initial response force is identified, in place, trained, and ready to go. We have the reach-back capability and the ability to bring in additional force if necessary for extended operations, and prepared to remain in place until the end of Operation ENDURING FREEDOM. The C/JTF is not a large force, we do not claim that we can fix a major event, but we do believe that we can reinforce and augment the capabilities of any host nation that might have an instant that requires our services.

Promoting Stability and Capability: Regional Cooperative Initiatives

**Mr. Paul Malik
Director,
Department of State Regional Environmental Hub-Jordan**

Thanks very much, Admiral. Ladies and gentlemen, I am very pleased to be here this morning. First of all, I would like to thank our Qatari hosts, the Qatar Armed Services, as well as extend my appreciation to U.S. Central Command, the Near East-South Asia (NESAs) Center, and the United States Army War College, for their kind invitation for me to come and speak today. I will discuss regional cooperative initiatives here in the Middle East. My office is located at the United States Embassy in Amman, Jordan, and I would like to give you a bit of background on it.

The Regional Environmental Hub's mission is to, "build regional coalitions and foster regional cooperation on trans-boundary environmental issues. Facilitate discussion and cooperation within a region on issues of common importance." Practically speaking, what we do is facilitate cooperation. We network within the Middle Eastern region among individuals, institutions and governments and help to organize and conduct training and workshops, specifically on environmental issues.

I would like to draw on something that Ms. Alina Romanowski, Director of the NESAs Center, mentioned yesterday in her opening remarks. Alina mentioned you could look at Environmental Security through a number of different lenses. I would like to ask you today to indulge me and look at it through an economic lens. This is the way that we look at it, in my office, and have found that sustainable development is really the key to Environmental Security and stability within the region.

One definition of sustainable development is environmental stewardship and without environmental stewardship, we have environmental degradation. It impacts the environment quite substantially. These environmental changes have a very negative effect on not just the population in the region, but also on natural resources. Dr. Butts talked a little bit about the type of degradation that can occur.

Obviously, it can be man-made through mismanagement; it can be intentional, as in the case of a terrorist incident; and it can also be natural. We have both qualitative degradation and quantitative scarcity, and, at this point, I would like to walk you through a cycle that I feel threatens the Environmental Security and stability within the region.

These environmental changes can impact the social fabric and demographics of a particular country, community, or region. Specifically, what we find is it has a deteriorating effect on health conditions, and thus can oftentimes cause migration or population displacement. These negative social and health impacts can further throw off the economic balance of a particular country or region, leaving the population vulnerable. We find increases in poverty when there is environmental degradation and an inequitable distribution of wealth, services, and natural resources that are available. This sets the scene for corruption, and this sort of economic disruption ultimately can erode political institutions. The corruption that I mentioned, which is a result of the economic degradation, can impact legal mechanisms and break down law enforcement. Also, citizens feel that they no longer are part of the system, and levels of resentment tend to rise. Ultimately, civil authority can be challenged.

Taking all of these into account—the environmental changes, the degradation that occurs at a particular location or within a region, as well as the consequent disruption of social and economic and political institutions—I think you will find these are all a recipe for disaster. I would like to present this chart; it is what I am calling the vicious cycle (figure 5-7). I think you will notice here, beginning with the environmental degradation that I spoke of, it has a negative impact on health, causing agricultural production to decline, and resulting in economic losses, which encourages corruption. When the population senses it is no longer part of the system, that it is disenfranchised from political and economic aspects of life, then resentment increases, authority is challenged, ultimately leading to civil unrest, all of which again further degrades the environment of that particular community or region.

How do we combat the vicious cycle? The Hub focuses on environmental cooperation within the Middle East and North Africa, and I think that most people here in the room would agree that

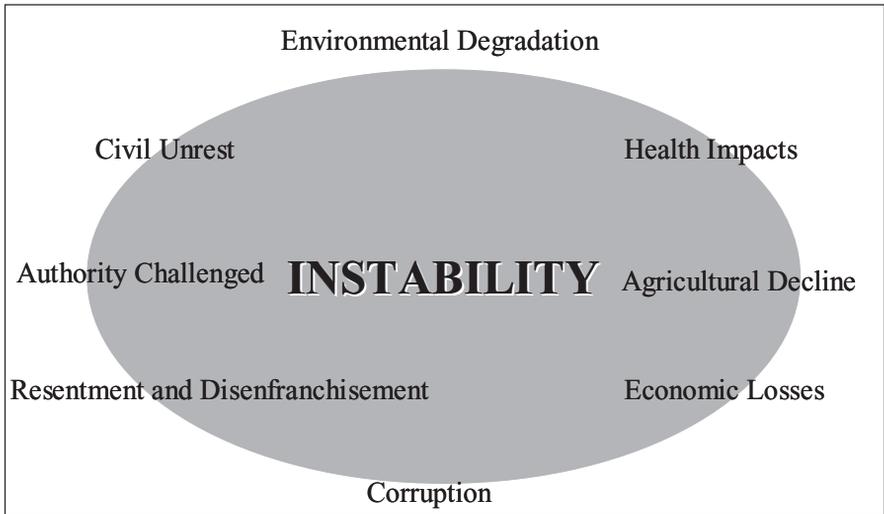


FIGURE 5-7: THE VICIOUS CYCLE

relationships, and when I talk about relationships, I mean from the personal level through institutional and government and international levels, help to foster communication. This communication builds trust and is a confidence-building measure. It allows individuals to exchange information, and data, and we find that transparency is oftentimes the result of good communication. This confidence-building measure that goes along with transparency ultimately leads to good governance.

I would like to consider all of these elements ingredients for economic opportunity, and that leads me to my other graphic chart, which is the virtuous cycle (figure 5-8). Here, we have environmental stewardship, or protection and cooperation on the environment, at the vanguard. This helps to create jobs, encouraging an increase in income of the local population, alleviating poverty, raising living standards, giving individuals more expendable income, oftentimes boosting economic growth. This growth leads to increased investment in the community, country or region, and, once again, brings us back to environmental stewardship.

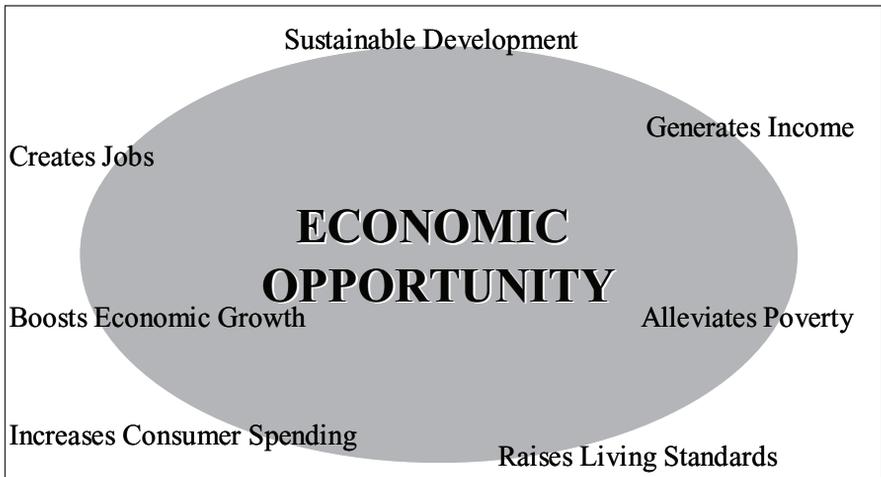


FIGURE 5-8: THE VIRTUOUS CYCLE

Within the context of my office, we do a lot of our work in the Middle East Peace Process multilateral working groups, and this is how we encourage the virtuous cycle. The United States is the gavel holder for the Water Resources Working Group. I will discuss a couple of the projects that we feel have made a difference within the region. The first is the Executive Action Team (EXACT). The Water Data Banks Project, an element of EXACT, is a project that is administered by our U.S. Geological Survey, of which Dr. Michael Foose is a member. The project has brought together the Palestinians, Jordanians, and Israelis to work on data exchange, specifically on their scarce water resources. The interesting thing is that while we act as the administrator of the project, it is really driven by the core parties. These individuals meet on a regular basis and decide which projects they will conduct to best meet the needs of each of their countries. This has continued despite the Intifada and the current situation in the region, underscoring the Palestinian, Jordanian, and Israeli commitment to regional environmental cooperation to enhance political stability and security.

WaterNet is a similar project and is funded by the Norwegians. It is an information exchange program amongst the core parties, Palestine, Jordan, and Israel. WaterCare, very briefly, is a school curriculum developed by the core parties. It is a public awareness effort, and it will be introduced (hopefully in the next year or so) to the school systems

of the Palestinians, Jordanians, and Israelis. It is a joint project, and we are hoping that it will be a big success in terms of raising consciousness about the scarcity of the water resources within the region and the need to cooperate for the sake of stability and security.

Finally, the Middle East Desalination Research Center (MEDRC) is an institution located in Muscat, Oman. Membership to the Center is open to anyone and everyone. It is a unique center that brings together scientists to work specifically on improving efficiency and effectiveness of desalination techniques, fostering greater cooperation, and encouraging new technologies.

The second Middle East Peace Process (MEPP) working group in which we work is that of the Environment. Japan is the gavel holder, although, the United States does play a significant role in guiding its priorities. There are two projects that I would like to discuss. Combating desertification is one that is led by the World Bank and the International Center for Agricultural Research in the Dry Areas (ICARDA), based in Syria. It has been a successful program in the realm of scientific collaboration and technology transfer. What I would like to emphasize, is that it is not just composed of the core parties, but also includes Egypt and Tunisia. The other programs I would like to bring to your attention are the U.S. Environmental Protection Agency (EPA) Environmental Enforcement training module and the Solid Waste Management Programs. These are modules developed by the U.S. Environmental Protection Agency, and introduced to the region, specifically for the countries within the Middle East and North Africa. The parties that participated helped to develop the training to ensure it met their specific needs. We are hopeful in the next year or so, the Hub can develop additional modules on hazardous waste and environmental economics, showing the costs to the economy of not safeguarding the environment.

The Middle East Regional Cooperation Program (MERC) is one of the most successful programs that we have, bringing together core parties (Palestine, Jordan, Egypt, Morocco, Tunisia, Lebanon, and Israel) on environmental issues. The program is an outgrowth of the Camp David Accords of 1979 and has brought together Arab and Israeli scientists for over 20 years. In the beginning, it was just Egypt and Israel, although over the years it has evolved to include Palestine, Jordan, Morocco,

Tunisia, and Lebanon. The program promotes sustainable development and improves the quality of life of the citizens of the Middle East and North Africa region, and it does that through applied research. This is an excellent opportunity for scientists from all fields to work together. What we have found most heartening is that they are able to put their science above politics.

Here are three examples of MERC projects (figure 5-9). I would like to draw your attention in particular to the last one. I think you will note that it might be of particular interest to the military audience that we have here today, because of the research that it is done on seismic activity in the Dead Sea Rift Valley, and the applications that this has for civil defense teams on both sides, both Jordan and Israel, to be able to respond to any kind of catastrophic occurrence.

While we do have a lot of our work within the context of the Middle East Peace Process multilaterals, we are not limiting ourselves to that, and are looking for ways to encourage as much cooperation and collaboration among the Arab states within the Middle East and North Africa. I have set it as a personal goal to try to do this, and I look forward to working with all of you to make this happen in the next couple of years. I am encouraged already by the achievements that have been made by Arab countries in collaborating and cooperating on some of these sensitive issues. In particular, we have the Regional Organization for the Protection of Marine Environment (ROPME), mentioned yesterday; the Marine Emergency Mutual Aid Center (MEMAC); and the Protection of the Environment of the Red Sea and the Gulf of Aden (PERSGA), in which I believe Saudi Arabia is the only GCC member. In addition, I would like to just highlight Global Learning and Observations to Benefit the Environment (GLOBE),

- “Environmental Protection and the Ecological Impact of Wastewater Recycling and Reuse in the Transboundary Mountain Aquifer Areas Shared by Israelis and Palestinians”
- “Monitoring and Modeling of Salt-Water Intrusion in Gaza and Morocco”
- “Integrated Geophysical Study of the Dead Sea Rift for Hazard Assessment and Mineral Resources”

which is an American program for elementary and secondary school students, established in 1994. Of particular note, this year there were two joint GLOBE projects conducted by students in Bahrain, Lebanon and Jordan, on the water resources in their respective

FIGURE 5-9: EXAMPLES OF ENVIRONMENTAL MERC PROJECTS

countries. Finally, Jordan has a very strong background in water resources and over the years has been able to contribute substantially to training efforts and building the capacity of some of their neighbors.

Now, what I would like to do is introduce the concept that it is time to think strategically, develop that kind of strategic vision, and develop tactical implementation. It is important to overcome the environmental degradation that occurs both naturally, through mismanagement, and intentional means. Although I am not an expert in consequence management, I defer to my colleagues who are here and the experts, in our experiences we feel that communication, planning, training, and exercises are completely necessary. Something not to forget and I cannot impress upon you enough is that it is a multidisciplinary approach, and there are numerous actors that have to be consulted, if in fact you want to make a consequence management plan successful.

Of the stakeholders, we have the usual list of ministries and agencies within the government. The Ministry of Defense, I should highlight, and highlighted by many of the speakers, is an important actor in consequence management. It is oftentimes the Ministry that is able to provide the manpower and materiel to respond appropriately. Non-governmental organizations (NGOs) are important stakeholders within the process, as are international organizations, such as the United Nations Environmental Program, Red Crescent/Red Cross, and again, ROPME and MEMAC, which are particular to the Arabian Gulf. It is important not to forget scientists and academics. These individuals have the technical background and expertise to provide the necessary scientific assessments on which we base our responses and actions. This is why a program such as MERC is successful. Finally, industry is another key player. While I have only cited Arabian American Oil Company (ARAMCO) as one example, as was pointed out in the presentation on the Qatar Electrical and Water Organization, utility companies should be a part of any national or regional consequence management plan. Although we think of industry as a source of environmental degradation and pollution, it is also part of the solution. I cannot underscore for you enough that industry does take preventative measures and this is a very significant part of consequence management. It is all about planning ahead and developing contingency plans to respond after an incident.

So, with coordination and cooperation and collaboration, these are some of the benefits that we can reap:

- Economic – leverage and share limited resources
- Efficiency – streamline decision-making
- Effectiveness – identify new technologies
- Emerging Opportunities – buy-in of stakeholders for future collaboration

There are additional successful examples of relationships that exist in other parts of the world. I have highlighted the U.S. relationship with Canada and Mexico--of course, very significant relationships on all levels for us. In particular, the U.S. Coast Guard manages inland waters, in the form of our Great Lakes and the coastal zones. Whenever there is an occurrence of an event involving environmental degradation that requires a response from both sides, there is a formal protocol already established. When forest fires, normally handled by local fire fighting units, extend beyond their capabilities, and I think we have seen this in the last year, the National Guard and the military are oftentimes called in to provide assistance. An example of the key role the military has to play in environmental protection and consequence management.

So, in summary, the foundation is here. I was pleased to hear about the military exercises that take place on a regular basis amongst the GCC countries, and you are certainly to be lauded for the kind of cooperation and initiatives that you have already taken. I would like to ask you to recall the two cycles once again. There is the vicious cycle and the virtuous cycle. There is a choice, and I think it is clear which one we want to make. So, I leave you with the challenge that the GCC work more collaboratively and cooperatively together to develop the consequence management plan that can respond efficiently and effectively to any sort of economic and environmental degradation.

Turkish Earthquakes: Response, Lessons Learned, New Procedures and Mechanisms

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INTRODUCTION

During the recent decade Turkey has been the scene of several urban earthquake disasters (figure 5-10). The recent series of devastating earthquakes during the last 10 years have caused housing losses in hundreds of thousands, loss of lives of tens of thousands and created a financial loss in excess of 22 billion USD (about 10% of the average gross domestic product (GDP) or about 1% annual GDP loss).

Earthquake	Lives Lost	Housing Units Damaged/Collapsed	Number of Homeless	Approx. Total Damage (Billions USD)
1992 Erzincan	645	8,000/1,500	10,000	1.0
1995 Dinar	100	6,500/2,000	8,000	0.4
1998 Adana-Ceyhan	150	21,000/2,000	24,000	0.5
1999 Kocaeli	18,000	320,000/40,000	600,000	20.0
1999 Düzce	812	10,100/800	-	1.0

FIGURE 5-10: RECENT EARTHQUAKE LOSSES IN TURKEY

In the 1970 Gediz, the 1976 Lice, the 1983 Erzurum-Kars, the 1992 Erzincan, the 1995 Dinar, and the 1998 Ceyhan-Adana disasters, the emergency response was fairly consistent and predictable. Survivors on the scene were the first to begin search and rescue, with their bare hands, without lifting equipment, listening devices, sniffing dogs, or lights in the darkness. Local press and visual media were quickly on the scene, followed hours later by foreign search and rescue teams, then even later by NGOs (non-governmental organizations) and governmental organizations. The sheer size of the Kocaeli earthquake disaster strongly challenged the existing emergency management system in Turkey. This study will first describe the earthquake disaster and the immediate response, and then will analyze the problems and provide information

on the lessons learned. The post earthquake developments will cover the rehabilitation; new paradigms, institutions and the legislations initiated for the improvement national post earthquake response capabilities.

KOCAELI EARTHQUAKE DISASTER

On August 17, 1999, a magnitude MW 7.4 earthquake struck the Kocaeli and Sakarya provinces in northwestern Turkey, a densely populated region in the industrial heartland of Turkey. I have published a comprehensive report on this earthquake (2001). It is described as one of the twentieth century's most powerful, rivaling the 1906 earthquake that ravaged San Francisco. The cities devastated by the earthquake included Izmit, Sakarya, Istanbul, Bolu, Bursa, and Eskisehir, and they comprised Turkey's most important industrial hub. Effects of the tremor were felt as far east as Ankara, 200 miles away, and across parts of the Balkan Region.

The earthquake nucleated at a depth of about 15km at about 10km east of the town of Gölcük. It is associated with a 120km rupture involving four distinct fault segments on the northernmost strand of the western extension of the 1300 km-long North Anatolian fault system. Predominantly right-lateral strike slip offsets were in the range of 3 to 4 m over a significant length of the fault. The earthquake region has been identified as a seismic gap with stress concentrations indicative of a large impending earthquake.

The August 17 earthquake is considered to be the largest event to have devastated a modern, industrialized area since the 1923 Tokyo earthquake. The earthquake caused considerable damage to residential and commercial buildings, public facilities and infrastructures with substantial casualties in an area of 20km by 200km. The number of condemned buildings after the earthquakes amounted 23,400. About 16,400 of these were heavily damaged and collapsed buildings during the earthquakes, which encompasses around 93,000 housing units and 15,000 small business units. Another 220,000 housing units and 21,000 small business units have experienced lesser degrees of damage. As much as 120,000 families were left in need of homes after the earthquake. The number of totally collapsed buildings (pancake collapse) is estimated to be in the range of 3,000-3,500. The pervasive building collapses in the

two earthquakes caused substantial number of casualties. There were 18,373 accounted deaths and 48,901 hospitalized injuries, of which about 40% will be left permanently disabled. The fatality ratio has reached a maximum of 7% in the center of Gölcük. Altogether up to 600,000 people were left in need of homes after the earthquake. About 95% of these losses were associated with the Kocaeli earthquake. In past urban earthquakes in Turkey almost 50% of all medium-rise reinforced concrete (R/C) frame buildings were damaged beyond repair in Intensity IX+ regions. This ratio is at least 4 times higher than what was observed in 1995 Kobe and 12 times higher than 1994 Northridge earthquakes.

The four districts most severely affected (Kocaeli, Sakarya, Bolu and Yalova) contribute over 7% of the country's GDP and 14% of industrial value added. Per capita income is almost double the national average. Though containing only 4% of the nation's population, the region contributes over 16% of budget revenues. The immediately surrounding districts (of Bursa, Eskisehir, and Istanbul) have been mainly affected indirectly by their close economic linkages with the former area, e.g., industries and small businesses supplying services or material inputs to each other's production processes. They also are subject to a shared seismic risk and so face magnified uncertainty for the future as a fall-out of the recent events.

Taking all seven cities together, the wider earthquake region accounts for 35% of national GDP and almost half of the nation's industrial output. Building losses are reported to amount to about 5 billion United States dollars. Damage to lifelines is estimated to be in the order of US\$1 billion. Industrial facilities and small business losses are respectively about US \$2 and US \$1 billion. If we assume that the indirect socio-economic losses is about as much as the direct physical losses, the total loss figure will be in the vicinity of US \$16 billion (about 7% of GDP of Turkey). Most of the industrial (large facilities) losses were covered by the insurance. A sizable portion of the residential losses (about 3 billion USD) was borne by the government.

DISASTER MANAGEMENT SYSTEM AT THE TIME OF THE DISASTER

The disaster management response system in Turkey is centralized and hierarchical. Responsibility moves from district level to provincial level and to national level as the size of the event grows (Guler and Ergunay, 2002). The central organizational structure of the disaster management system on the basis of the Disaster Law (No: 7269, Date: 1959) is provided in figure 5-11.

The “Central Coordinating Committee” is the main body in the central government comprising of undersecretaries of related ministries, president of Turkish Red Crescent Society and a representative from General Staff. Upon the decision of Prime Minister a “Crisis Center” can be formed with the organization shown in figure 5-12. General

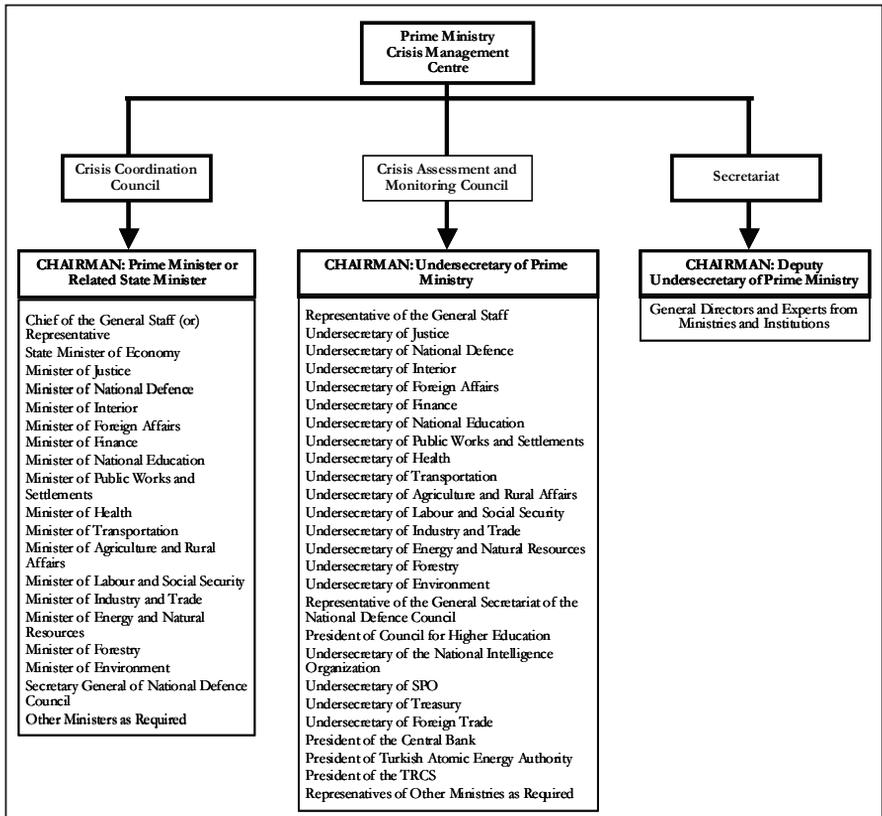


FIGURE 5-11: ORGANIZATIONAL SET UP OF CENTRAL COORDINATION COMMITTEE (AFTER GULER AND ERGUNAY, 2002)

The Cabinet	
CENTRAL DISASTER COORDINATING COMMITTEE	
CHAIRMAN: Undersecretary of the Ministry of Public Works and Settlement	
UNDERSECRETARIES OF THE MINISTRIES OF:	
-	National Defense
-	Foreign Affairs
-	Finance
-	National Education
-	Health
-	Transportation
-	Agriculture and Rural Affairs
-	Forestry
-	Environment
and	
-	President of the Red Crescent Society
-	Representative of Turkish General Staff (Army)
Secretariat: General Directorate of Disaster Affairs (GDDA)	

FIGURE 5-12: ORGANIZATION OF THE CENTRAL CRISIS CENTER
(AFTER GULER AND ERGUNAY, 2002)

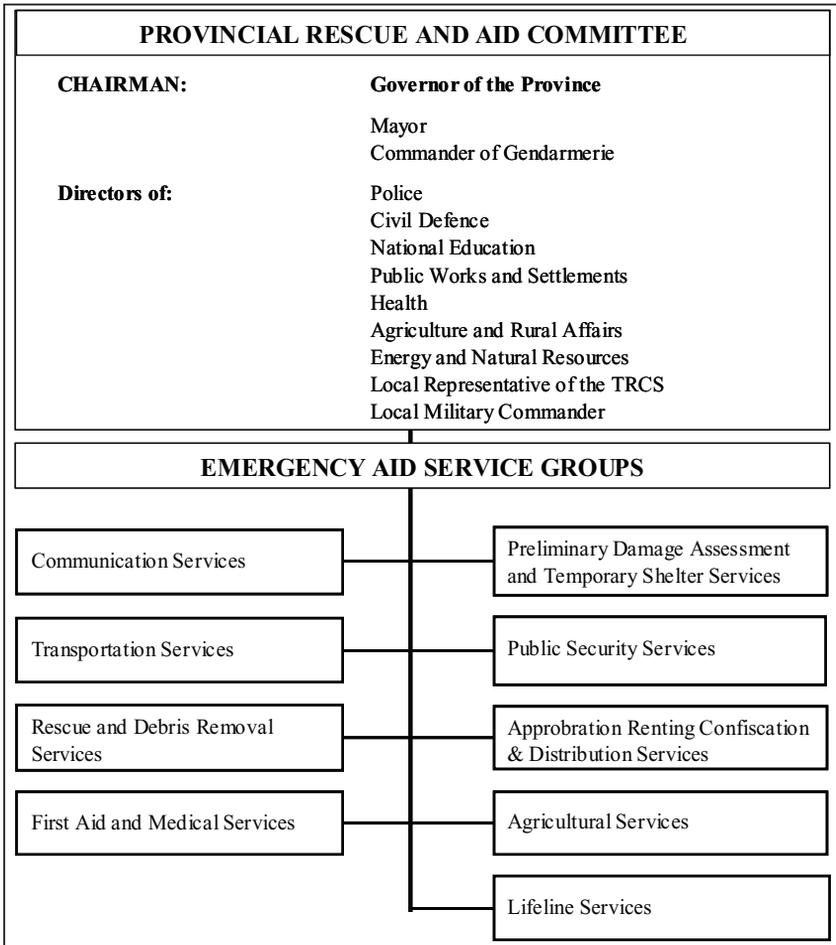


FIGURE 5-13. ORGANIZATION OF THE PROVINCIAL RESCUE AND RELIEF ASSISTANCE COMMITTEE

Directorate of Disaster Affairs under Ministry of Public Works, General Directorate of Civil Defense under Ministry of Interior and Turkish Emergency Management General Directorate under Prime Ministry are the central organizations involved in disaster management and response with somewhat overlapping mandates and activities.

At the provincial level the governor heads the so-called “Provincial Rescue and Relief Assistance Committee”, also known as “Crisis Committee” (figure 5-13). They are charged with preparation and implementation of disaster response plans with training and exercise activities. Turkish Red Crescent Society is a semi-governmental structure. Its main activities are disaster response, blood bank operations and first-aid training. Turkish Armed Forces always played an important role in the response and relief phases of disaster management. The military forces develop their own disaster plans starting from central down to small units. Armed forces are also represented in all of the disaster committees.

EMERGENCY RESPONSE

A brief chronological order of the Search and Rescue (SAR) and relief activities after the earthquake follows:

Day One

- Earthquake occurs at 3:02 AM.
- Kandilli Observatory reports a magnitude 6.7 earthquake in Marmara Sea at 3:20 AM.

Central Scene (Ankara)

- Prime Ministry declares a Crisis situation at 4:30 AM.
- Crisis Coordination and Crisis Assessment Councils meet at 6:30 AM.
- No communication possibility with the affected region (damage and blockage of telecommunication systems).
- Crisis Coordination Center sends message to all related ministries and General Staff of the Army have their disaster management plans implemented and to mobilize their SAR teams with limited information on where they would be needed.

- Two SAR teams from General Directorate of Civil Defense in Ankara reach Adapazari at 7:30 and Izmit at 9:00.
- At about 9:00 AM Crisis Coordination Center learns that all the transportation in and out of the affected region is blocked (due to traffic and damage) and most of the SAR teams (including Red Crescent) are waiting on the main freeway.
- Main source of information is TV. Several news teams from Istanbul with helicopters. Live reports of damage.
- At 10:00 army, police and gendarmerie in the vicinity of the affected region have established limited wireless communication. Limited information on casualties and damage is available. Fire at TUPRAS Refinery.
- Government orders all provinces to send SAR teams, relief materials and heavy machinery.
- Government requests for international assistance.
- Turkish Red Crescent appeals for assistance from International Federation of Red Cross and Red Crescent.

Local Scene

- Provincial Rescue and Aid Committees are formed in few hours in lesser-affected provinces.
- In Kocaeli, Sakarya and Yalova these committees were partially formed only after 10 hours after the earthquake.
- Bursa and Istanbul Governorates started sending assistance to Yalova and Kocaeli.
- In the first day there was no effective SAR and relief operation in the affected region. Locals, volunteers and local military personnel organized all the local activities in an ad-hoc manner.

Day Two

Central Government

- Central Crisis Management System became effective for central command and control.
- General Directorate of Civil Defense mobilized all available SAR teams, voluntary groups and coal mine workers. About 90

government SAR personnel, 40 NGO volunteers and 148 coal miners.

- About 10,000 army personnel were activated for SAR.
- Ministry of Health sends 113 ambulances, 116 physicians and 350 paramedics and nurses.
- Turkish Red Crescent sends 3,000 tent, 10,000 blankets, and 5 mobile kitchens.
- Twenty foreign SAR teams with 700 personnel arrive.
- Turkish Petroleum Refineries Corporation (TUPRAS) fire grows out of control.

Local Level

- Provincial Rescue and Aid Committees in Kocaeli, Sakarya and Yalove provinces became more effective.
- Local SAR and relief efforts continued with no effective coordination.

As it can be assessed, the emergency management, SAR, and relief activities were totally inadequate and inefficient in the first two days. Coordination, command and control at all levels were ad hoc or limited. Much of the initial response was by survivors. International search and rescue teams began arriving within 24 hours, and 65 foreign SAR teams saved 621 lives in intensive efforts that continued for four or five days following the earthquake. Overall SAR personnel from General Directorate of Civil Defense rescued 245 victims from collapsed buildings. About 64,000 military personnel from the Turkish Army were engaged in SAR, relief, and security operations in the affected area. Turkish Armed Forces built a casualty center at Izmit Cengiz Topel airport, conducted triage, provided first aid and transported serious injuries to active hospitals via ships and helicopters. Army provided SAR, relief and transfer services for about 40,000 earthquake victims. Foreign SAR teams from about 50 countries participated in the SAR operations with approximately 3,600 personnel.

According to United Nations Development Program (UNDP), a total of 87 countries provided emergency assistance to Turkey by the end of September. This assistance included SAR teams, consisting of 2,463 personnel from 44 countries. Nineteen countries sent mobile hospitals; 26 countries provided 406 medical personnel; 45 countries

sent approximately 30,000 tents; and 23 countries supplied 121,147 blankets. Three ships from the U.S. Sixth Fleet deployed from Spain and provided 2,100 Marines, 60 hospital beds, six operating rooms, and five X-ray rooms to render assistance. The 22 helicopters on the ships provided medical evacuations from the damaged areas. The U.S. military also assisted earthquake victims through its European Command (EUCOM) under "Operation AVID RESPONSE." On August 19, U.S. Naval Forces Europe, stationed in Naples, Italy, dispatched a 24-member surgical response team. One of the most urgent needs was for firefighting equipment to cope with the massive oil refinery fire. Three C-130 Air National Guard planes; equipped to spray fire retardants and suppressants, were sent to Turkey.

The initial response to the Kocaeli earthquake was similar to the prior earthquake disasters. The Prime Minister's National Crises Action Center reportedly was activated on day one, followed by provincial and township crises center activation. Quickly, television and newspaper reporters descended on the scene and were broadcasting to the nation from town after town that suffered casualties and damages. However, mainly due to the sheer size of the disaster, professional search and rescue efforts were slow to respond, and the public viewed this live on TV. For about two days, live cameras showed the enormous strain on the survivors and the lack of response. Survivors received little assistance within the first 48 hours, and some got no help for up to four days. Because major hospitals were damaged, field hospitals were established with international assistance. The affected populace has mobilized a massive public opinion that questioned the responsible institutions in Turkey. Criticisms were directed toward their inability to quickly and adequately respond for search and rescue.

LESSONS LEARNED

Kocaeli earthquake has clearly demonstrated that Turkey is in need of a new emergency management plan that is effective from top down, and bottom up. It needs to be created from scratch and practiced frequently. The highly centralized, hierarchical, top-down characteristic of the disaster management in Turkey discourages local initiatives and limits community participation. Despite the rigid structure of the system, lack of coordination and ad-hoc management were substantial

problems as witnessed in the first days of the 1999 Kocaeli Earthquake. Communication, coordination and cooperation problems between appointed and elected administrators have, in certain cases, hindered effective SAR and relief operations. Lack of rapid loss estimation system, lack of disaster scenarios and disaster operation plans, shortage of equipment and materials and an absence of disaster response training hindered organized and effective search, rescue and relief operations.

These lessons helped initial rectification of the emergency management system. In fact, the October 12, 1999 Duzce earthquake that took place roughly three months later, governmental and military personnel including coal miners and volunteers successfully handled the Search and Rescue operation. The rapid and effective response to the disaster was due to somewhat smaller size of the earthquake and the quality and quantity of the SAR personnel. In the Duzce earthquake, in some cases, the large international teams even inhibited that response by placing an unnecessary logistical burden on the local authorities.

NEW DEVELOPMENTS

Kocaeli and Duzce earthquakes affected a very large area in the nations industrial heartland, causing extensive building damage, casualties and displaced people. Most of the victims were urban, upper middle class. Damage to industry and small business were widespread. With about half a million displaced people and total losses reaching 20 billion USD rehabilitation was not an easy and speedy process. There was a general outpouring of criticism by the public to the existing disaster management system.

About 120,000 families in need of emergency housing after the earthquake were sheltered, in about equal proportions: in tent cities; in individual tents and public buildings and; friends/relatives and rented houses. Within several days to few weeks, a total of 165,000 tents were distributed to affected people/families. A total of 162 tent cities encompassing about 28,000 tents were built. Although initially planned to be temporary, as of August 2000 about 30,000 people were still living in 33 tent cities. Several months after the earthquake about 40,000 prefabricated housing units were erected. Almost all of them are currently being used. In addition, about 130,000 families received 300

million USD rent assistance, and about 92,000 homeowners received 100 million USD “Light Damage” repair assistance.

An important dimension of the rehabilitation and recovery efforts of Turkey is the Marmara Earthquake Emergency Reconstruction project (MEER). The MEER project is part of the comprehensive Framework Program that has been prepared by the World Bank in cooperation with UNDP, the European Union, other co-financiers and other donors at a total cost of US\$737.11 million. In summary the project aimed: Creation Of Emergency Management Agencies at National and Municipal Levels; Creation of Disaster Insurance Scheme; Modifications in the Current Disaster Law, Municipalities Law and Public Tender Law; Strengthening of the Municipal Capability for Disaster Resistant Development; Developing Risk-Based Municipal Master Plans; Establishment of a Land Information System; Trauma Program for Adults; Construction of Permanent Housing; Business Rehabilitation; Repair of Existing Housing Stock and Healthcare Facilities; Rebuilding and Repair of Infrastructure And Lifelines.

Following important developments have taken place in connection with the post-earthquake rehabilitation and disaster management.

Post Earthquake Housing

For repair/strengthening of medium damaged housing units the government has extended about USD 5,000 low interest credit to about 50,000 homeowners with long payment terms. Extensive applications of repair and strengthening are being undertaken with varying quality and control. About 38,000 have been constructed and delivered to eligible homeowners. These were provided to qualified families with very easy pay back conditions. Financing came from the following sources: the World Bank (30%), the European Development Bank (30%) and Government (30%) credits. The remaining 10% was financed through private donations. The distribution of permanent housing with respect to the affected provinces are as follows: Duzce – 8400; Bolu – 1458; Sakarya – 6404; Kocaeli – 15,300; Yalova – 5,408 and; Istanbul – 1,209.

Rehabilitation of Lifelines

About 600 million USD has been spent for the rehabilitation of urban infrastructure. Regarding the highway system, about 85 bridges in the earthquake-affected region were repaired.

Legislation for Building Design and Construction Supervision

Legislation was enacted on April 10, 2000 to enforce mandatory design checking and construction inspection of all buildings (initially in 27 provinces) by government-licensed private “supervision firms”. Supervision firms must be owned by a majority of engineers or architects and are required to hire “expert” professionals and have professional liability insurance. For new buildings this supervision will ensure compliance with earthquake resistant design code and nominal construction quality standards. The government has recently waived the requirement for insurance due to problems in getting liability insurance with uncertain coverage of earthquake damage.

Revision Of Law On Engineering And Architecture

On June 28, 2000, a professional qualification “expert” system under certification by chambers of engineers and architects was established. To start the system all engineers and architects with 12-year professional experience are awarded with the “expert” title. Current activities are underway to provide professional training to those already awarded with the “expert” title.

Standardized Development Regulations for Municipalities

This decree is intended to develop uniform land-use regulations in municipalities. Substantial geological and geotechnical investigations are specified to establish land use decisions.

Compulsory Earthquake Insurance

Through a World Bank project a government-sponsored Turkish Catastrophic Insurance Pool (TCIP) is created with the essential aim of transferring the government’s financial burden of replacing earthquake-damaged housing to international reinsurance and capital markets.

New Government Institutions

Turkey Emergency Management General Directorate (TEMAD) was formed directly under the prime ministries office. Emergency Management Agency of Turkey was established, within the body of Prime Ministry on Nov. 22, 1999. It is empowered nationwide to take necessary measures in order to provide an effective emergency management for earthquake and other natural disasters, technological accidents and population movements that are in such a scale that threatens national security and to provide coordination between related agencies. Formal civil defense units for SAR operations have been formed in all provinces and several sub-provinces.

Community Training

Several universities, NGOs, Turkish Red Crescent-American Red Cross, FEMA and other concerned agencies are working with local offices of emergency management, neighborhood groups and business partners to increase community preparedness levels through training and education.

Earthquake Rapid Response and Early Warning System for Istanbul

For post-earthquake rapid response information (similar to the Tri-net of Southern California - Shake Maps) in Istanbul, Bogazici University has installed one hundred (100) 18 bit resolution “dial-up” strong motion accelerometers in populated areas of the city, within an area of approximately 50x30km, to constitute a network that will enable early damage assessment and rapid response information after a damaging earthquake. Early response information is achieved through very fast acquisition, analysis and elaboration of data obtained from the network. In normal times these stations will be interrogated on regular basis by the main data center located at the Kandilli Observatory and Earthquake Research Institute of Bogazici University (KOERI-BU). For the Early Warning system ten (10) (24 bit resolution) strong motion stations were located as close as possible to the fault area in “on-line” mode. The continuous on-line data from these stations will be used to provide near-real time warning for emerging potentially disastrous earthquakes.

SAR Unit of the Turkish Armed Forces

After the August 17, 1999, earthquake, Turkish Armed Forces decided to improve its capabilities on specialized search and rescue missions in order to better cope with large scale natural disasters. A battalion size search and rescue unit subordinate to Special Forces command is designed to conduct search and rescue operations in cases of natural and biological disasters. The unit is composed of professional soldiers well equipped and trained to carry out missions in Turkey and abroad. It can be deployed anywhere in Turkey within three hours and can conduct specialized search and rescue activities at eighteen different sites simultaneously up to 15 days without supply. NATO has recently established a “European-Atlantic Disaster Response Center attached to the Civil Emergency Planning Committee (SCEPC).” It is expected that this new mechanism will promote closer cooperation between civil and military sectors.

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Medical Responses

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Thank you very much. It is my pleasure to be with you today and share with you some of the medical viewpoints, in response to emergencies. I welcome all the guests here in Qatar, the guests from GCC and international community. Before I start, the talk by Professor Mustafa Erdik is of great interest because it shows the actual response to an event. We talk theoretically, but they have faced the situation, and a lot of lessons I am sure can be learned from their experience and invite Professor Erdik to write some of their experiences for our *Middle East Journal for Emergency Medicine*, which is published here in Qatar and has a wide distribution in the Middle East.

I read this morning an abstract of a paper published recently about physicians. They are very serious and the article states, “that in monitored consultation rooms they found out that 74% of the patients laugh or smile to the doctors, but only 10% of the doctors smile back.” I wonder what the results would be if the study was conducted on military personnel.

In order to discuss medical response, we have to discuss some of the principles of disaster management. Medical response and other emergency services are part of disaster management. In fact the general principles are the same and could be applied in all cases with some variations. These are the principles we seek to accomplish throughout Qatari society in general, and especially in the institutions and ministries particularly concerned with disaster management. This is conducted through a number of programs such as the International Hamad Center, which is a part of Hamad Medical Establishment.

The process is known by different titles. Military personnel call it consequence management and the World Health Organization and civilian organizations call it disaster management. Disaster management is more comprehensive title, because it includes more than just dealing

with the consequences. By that I mean planning, readiness, protective measures, response and healing from disasters.

There are several definitions for disasters, or crisis, adopted by the different sectors. Civil Defense personnel have a different definition from the one adopted by the health sector and both definitions are different from, the one used by the military. At the end of the day they all talk about more or less the same content. The health sector defines a disaster as, “when the health of the members of society is in danger or when the medical services are not functioning properly or when a large number of people are injured.” This is not a good definition because it is possible to have a large number of injuries and if the injuries are dealt with in a proper manner and distributed to several hospitals there is no loss in functionality. This is true when we talk about countries that have numerous well-equipped hospitals. However, for a country like Qatar, where there is only one hospital, then it becomes a big problem for the medical services. So it is a relative matter.

Disasters could be categorized in several ways. We use the expression of “contained” and “uncontained” disasters. A “contained” disaster is where the services are capable of dealing with the problem; “uncontained” disasters occur where the resources are not enough to deal with the consequences even if we call upon all the human and financial resources. Another kind of categorization is the “simple” vs. the “compound” disaster. If the infrastructure is affected then it is a compound crisis. Otherwise it is a simple crisis. There are natural, such as earthquakes and floods, and man-made disasters. Man-made disasters include acts of terrorism.

There are some common characteristics for all disasters. This is very important to understand in disaster management, because it allows those in charge, to build a common strategy to deal with the various characteristics, which are common to many types of disasters. For example, disasters involve a surprise element, they are violent, casualties and damage become worse if not dealt with, and are difficult to bear for an extended period of time. All disasters cause confusion, fear, and a sense of helplessness. Decision makers are always under pressure and need innovative and fast methods to deal with these crises. Some crises are distinguished from others by different consequences, such as the use

of weapons of mass destruction and these require different measures to deal with the consequences.

The crisis could effect individuals, an institution, an organization, and/or alternatively, affect the whole country. For individuals, the likely effect could be death or injury, including the spread of diseases. For institutions and states, disasters could affect their legitimacy, or cause a lack of confidence in the organization or establishment, or it could destroy the mission of the institution. There are many historical examples, where entire institutions or organizations, perhaps even states, were destroyed. Disasters have a well-known life cycle. The disaster grows very fast until it reaches a peak and then starts diminishing over time. This point is very important, because of the necessity to act fast in order to speed up the life cycle from the peak to the decrease in effect. The disaster itself could last for hours, days, weeks, or months, but the consequences could be prolonged and last for a longer period without adequate intervention.

There are common objectives for individuals and authorities involved in crisis management. The most important one is to prevent disasters through proper planning and protective measures and alternatively, minimizing the effects of the disaster if it happens. Another objective is to protect society and the environment and to save lives and property. The latter is an important objective for the military, doctors, police, and civil defense forces. Rebuilding and re-establishing basic services, repair the infrastructure in the disaster area, manage and protect financial, medical and human resources, are important common objectives.

Crisis and disaster management have some common and important terminology, such as comprehensive management, defined as, “dealing with all the 12 steps to manage crises and disasters.” All steps should be dealt with adequately aiming at sustainable development. The responsible authorities need to analyze the dangers in any society, industry, or company to ensure all the aspects of dangers are addressed without focusing only on one aspect and forgetting the rest. Naturally, the dangers should be prioritized. To cover all the sectors means that all the governmental agencies and departments should be represented as well as non-governmental organizations when managing the crisis. This is done through the participation of the different ministries in the committees and the crisis management command structure in any

country. Disaster management is the responsibility of everybody, the importance to analyze all the dangers, and to keep these in mind during the planning process for sustainable development. Concerned authorities should focus on the actual steps that cover all the aspects and not only the written plans, which is often the case in the Third World.

The process for developing a disaster management plan begins with passing laws and policies approved by the government, state, and individual organizations. Higher-level management of an organization should have defined policies and a written agenda to begin the planning process. The leader should define the mission and form a working group that includes the various organizations who are responsible for disaster management. The working team develops a detailed explanation of each organizations responsibility and resources to provide and an analysis of available capabilities. The plan is approved and put in place for response in the event of a disaster. Following the incident, efforts are focused on restoring normal conditions in the affected area, as well as, continuous monitoring and evaluation. The latter is extremely important in the development of disaster management plans. Conditions will continue to change; therefore it is important to continue the monitoring and analysis, and to change the plans accordingly where necessary. Teaching and training are very important, and that is what we hope will take place here in Qatar. Our objective is to create awareness among a large number of people about disaster management at all levels.

Obviously there is an interaction between the community, the environment, and risk. Each influences the others. Any change in the community could influence the environment, while changes in the environment could cause risks that consequently could influence the environment and society.

We can easily say that the steps for risk management, a clear evaluation of the potential impact of these risks, and the best methods for crisis management are all basic matters for planning the strategy to deal with disasters in any country or organization. In Qatar we have the Permanent Committee for Emergencies, established by a cabinet decree. The Armed Forces has established the Joint Operations Center. The Ministry of Interior governs the Permanent National Emergency Committee. The Joint Operations Center is a newly established center and the first meeting

was conducted on 16 September 2002 under the supervision of the Armed Forces. We look forward for a total coordination effort between the Emergency Committee and the Joint Operations Center. The Ministry may even merge the Committee with the Joint Operations Center, to avoid confusion about the respective areas of supervision for each group and to use resources more wisely in the future. The Joint Operations Center is a good start and hopefully the merger will take place in the future. Of course this team would constitute the highest command for disaster management in the country. It is therefore important that this team should include representatives from the various relevant ministries and organizations, technicians, and experts. Representatives who work on this team should be of high caliber and authorized to make decisions. In the case of a disaster, it is very difficult and time consuming to go back to people in authority and wait for their decision. Waiting for a decision causes unnecessary delay and, as stated in Professor Erdik's presentation, saving the lives of individuals depends a great deal on rapid response. If the chances for saving lives during the first half hour are 90%, quickly falls to 50% after one hour, and to 30% within twenty-four hours.

Some of the key characteristics of the working team are: capable to communicate horizontally and vertically among the officials of this authority, as well as between them and their own higher authorities; able to make decisions; participate in setting the plans; they should possess loyalty; a willingness to sacrifice; and the ability for teamwork. Personal skills are very important, as well as mental and practical skills.

The steps in disaster management are very important because, as we mentioned earlier, speed plays an important role in minimizing the consequences. There are five stages. The first stage is the initial evaluation and assessment. This stage starts at the beginning of a disaster and continues throughout the full life cycle of the disaster. The second stage is the immediate assistance, followed by sustained assistance, followed by withdrawal and rehabilitation or going back to the normal situation as it was before the disaster, then comes redeployment which might continue in some cases for years. The various organizations that provide emergency services to deal with disaster management include; police forces, civil defense, medical services, Ministry of Defense, and the auxiliary services. Coordination of services among these bodies is very important to achieve effective management.

I am not going to focus in great detail on medical services, as most of the audience today is not concerned with medical services. Medical services are divided into medical services at the hospital and at the site of the incident. There are general principles, which apply to medical services as well as others. These include setting priorities for the on-site response, whether by the police force, the civil defense personnel, the medical services, or the Ministry of Defense. The priorities are safety, management and control, assessment, communications, search and rescue, triage, treatment, and transportation of the injured.

We will talk about some of these priorities. When we say safety, we mean emergency personnel should ensure their own safety before rescuing others. We do not need to add to the burden of the emergency services by acting in haste to help people in a manner that will expose the rescuer to danger. This will only make the task of rescue operations more difficult and complicated and then comes the safety of the casualties and overall site safety.

Command and control refers to the various emergency services. Each service, for example medical services, must have its own vertical command structure. Control is the general control of the entire emergency services. For instance, at the site there are police, civil defense and medical services that should all be controlled by one responsible organization. The organization in charge could change from one disaster to another. When the disaster is concerned with diseases and epidemics, the Medical Service should provide control. For instance, the Army should control the operation if the incident is related to weapons of mass destruction. The control is changeable in accordance with the crisis or the nature of disaster.

Communications is very important in order to coordinate the activities at the site, such as the police, civil defense, military personnel and medical staff. Communication between the people in charge should run horizontally and vertically between them and their superiors at the ministries and the country's higher authorities.

The site of the disaster is divided into three areas: the Bronze area or the actual place of the incident that is isolated (fenced). This is called the inner cordon. Then comes the Silver area where all the action takes place,

the location where the practical steps are carried out by the different emergency services. Then comes the Gold area, the strategic area, which could be in the high command or the highest authority in the affected state. The most important area for the medical and other emergency services is the Silver area, which of course is adjacent to the incident site. This is where all the casualties are gathered, classified, and then transported to a loading zone where emergency transport vehicles are assembled. This is where vehicles are allowed to enter and exit the site. There are strict rules that govern operations in the area and entry to it. There are equally important rules that restrict entry into the inner cordon, in order to prevent additional injuries within the emergency services. On-site emergency services, including medical services, must carry out the initial assessment of the situation, classification of the injured, treatment and transport. These are very important basic matters. Any person present at the place of the incident, including the first arrivals of the emergency services, whether the police, civil defense or military forces, should gather this information in order to convey them to the communications center, so that the additional necessary resources would be made available. It is important to identify the location, the kind of disaster, whether there is continued danger, the impact on the infrastructure and environment, what type of transport is available, the roads leading to the location of the incident, and then the need for extra resources. The most important factor is basic life support: water, food and shelter.

The medical services working team should start the classification (triage) of casualties, then their transport to suitable locations. The objective of triage is to move the casualties to the right place, at the right time, and to make the best use of the resources available. You might find somebody who is badly injured and cannot be saved even if he is transferred to the medical services. This kind of casualty is called injury of the fourth category. Even though the injured is still alive, the injury is of such an extent that you know there is no chance of saving his life. This evaluation depends on the resources available, and might involve feelings of guilt. However, this type of injury will use up a lot of the resources that could be used to save a large number of people. It is a changeable and repetitive operation, and uses color codes. The first category (immediate) is red, second category (urgent) is yellow, third category (where assistance may be delayed somewhat) is green, fourth category (blue), which I mentioned above, where the injured is not expected to survive, and the

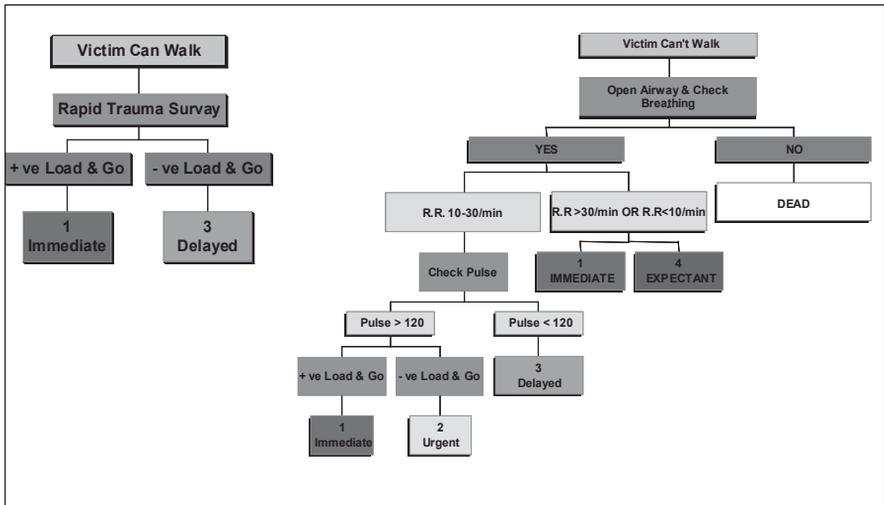


FIGURE 5-14: TRIAGE PROCEDURE

fifth (white), is for the deceased. This is the proper color-coding system used for the categorization of casualties.

This is the procedure for triage (figure 5- 14). It is not complicated, if it is carefully studied. Even the non-specialized person can carry out this process at the site of the incident. We are teaching this process to civil defense personnel, the police force and the public during our training courses.

There are responsibilities for the medical team that arrive at the site of the incident, for the paramedics, and plans for the medical team at the hospital. Making treatment available to save lives is very important to avoid additional casualties. The task also involves declaring cases of death and I will discuss this later.

Emergency services are extremely important when a disaster takes place, and we call upon additional emergency channels. The first ambulance that arrives at the scene is considered to be the control unit regarding the emergency. The attendant is designated as the acting Ambulance Incident Officer (AIO) until a higher command and control element arrives. The AIO establishes the safety zones (1, 2, 3) and communicates the initial scene assessment to ambulance or hospital command structure depending on the normal operating procedures. The AIO uses the key word, ETHANE to prepare the scene assessment.

ETHANE stands for, “Exact location of the disaster, Type of incident, Hazards, Access to the site, Number of victims, and Emergency services needed to respond. The first thing that should be done is to declare the site a major incident because a delay in declaration could lead to increased casualties or deaths. The driver remains with the ambulance.

Based on the scene assessment, additional ambulances and paramedics are sent to provide treatment to the casualties. The paramedics conduct dynamic triage and provide life-saving first aid, advanced life support treatment, and sets-up a casualty clearing station. The ambulances transport the casualties to local hospitals for advanced medical treatment. The hospitals activate their hospital disaster plan and if needed, mobilize mobile medical teams to the incident site.

The medical personnel are responsible for the declaration of death at the scene and isolating the dead and expectant casualties from the remainder. The dead are transported separately from the ambulatory and non-ambulatory casualties to the local mortuary.

Depending on the size of the incident, psychological effects, such as, Post Traumatic Stress Disorder may affect the victims, relatives, emergency service personnel, and the public. In these cases, advanced psychological assistance is needed to relieve the stress and affects as a result of the incident.

The Hamad International Medical Training Center conducts different levels of training for medical to civil defense personnel, police, and the public. The Center conducts lectures, symposia, workshops, self-learning modules, courses, conferences, and drills and exercises based on the training and learning objectives established by host organization.



CHAPTER VI

MULTILATERAL APPROACHES TO SECURITY COOPERATION ON ENVIRONMENTAL ISSUES

Introduction

Mr. Curtis Bowling, Principal Assistant Deputy Under Secretary of Defense (Installations and Environment) moderated this panel discussion. The objectives of the session were to promote environmental cooperation between defense and environmental authorities, identify opportunities for multilateral and interagency cooperation, explore the processes and mechanisms available to address consequence management planning, and describe the practical application of information age tools to enhance disaster response and consequence management planning

Coordinating Regional Disaster Response Activities

Mr. Gary Barrett
Office of Foreign Disaster Assistance,
United States Agency for International Development

Ladies and gentlemen, I am very pleased to be here this morning. First of all, I would like to thank our Qatari hosts, the Qatari Armed Services, as well as extend my appreciation to the U.S. Central Command, the Near East South Asia (NESAs) Center, and the United States Army War College, for their kind invitation for me to speak today. I will provide an introduction to the United States Agency for International Development's (USAID) Office of Foreign Disaster Assistance (OFDA).

I will present an overview of what the Office of Foreign Disaster Assistance does. I hope to cover what a disaster is, versus a humanitarian assistance operation, the humanitarian coordination framework we work within, some of the coordination challenges, how OFDA deals with consequence management, and lessons learned from various relief operations.

OFDA is responsible for the coordination of the U.S. Government's (USG) nonmilitary response to international disasters. The overarching tasks within this mission are to save lives, alleviate suffering of disaster victims, reduce the economic impact of the disaster, and support prevention, mitigation, and preparedness activities. The U.S. Government, through our office, may respond if the disaster is beyond the ability of the affected country to respond adequately, if the affected country requests (or will accept) outside assistance, and if response is in the interest of the U.S. Government.

So, who can declare a disaster? Normally the requests are received from the Ambassador, Chief of Mission, or the Assistant Secretary of State from the affected area or region (e.g. Somalia and Northern Iraq).

OFDA has a wide range of response options. These options include, but are not limited to, deploying regional advisors and assessment teams, and funding non-governmental organizations (NGOs), international organizations (IOs), and United Nations Relief organizations directly. Funds are also available through U.S. Embassy and USAID missions.

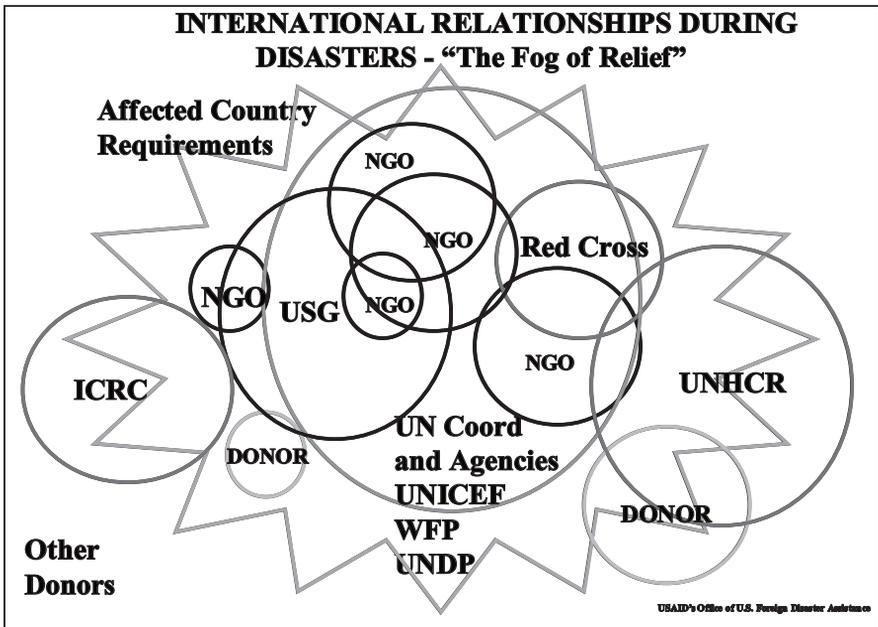


FIGURE 6-1: INTERNATIONAL RELATIONSHIPS DURING DISASTERS - "THE FOG OF RELIEF"

OFDA can provide disaster relief commodities, and/or deploy a Disaster Assistance Response or Ground Operations Teams (DART/GO).

During a disaster, there are a large number of organizations and donors providing assistance to the affected country (figure 6-1). There is what we call, “the fog of relief.” Each organization has their agenda and purpose for providing assistance and the ability of the affected country to organize and foster international relationships toward a common goal is necessary to provide maximum effort without wasting limited resources. The humanitarian framework consists of six major organizations: the affected country, military organizations, NGOs, the U.S. Government, the International Committee of the Red Cross (ICRC), and United Nations (UN) organizations.

As stated earlier, based on the donor’s purpose and charter, the challenge is coordinating the relief efforts. The lack of common language between different corporate cultures will result in a communications challenge. Who is in charge? Who is defining roles and responsibilities for each organization? The affected country and donor organizations need to link their political strategies to field operations. A key factor is the change of personnel.

How can we overcome the “fog of relief”? The affected country needs to develop and articulate a clear political strategy to the relief organizations. If military organizations are used, the military needs to understand that short-term actions can affect the long-term situation. During the planning phase, the operations plan needs to phase in the transition to a purely civilian effort, not during the execution phase. Finally, the more complex the situation, the more challenging it is to create a shared vision and a commonsense integrated strategy.

What are the lessons learned? Civil-military relations must be developed and fostered based on mutual support. Humanitarian intervention is a people-intensive process, and there is a continuum of effort in which all parties have a proper role to play in the relief effort.

I would like to shift the focus from humanitarian assistance operations to consequence management. Consequence Management is “where there is a contaminant.” Presidential Decision Directives (PDD)

39 (June 1995) and 62 (1998) are policy directives for responding to a terrorist threat or use of a weapon of mass destruction in the United States or overseas. The PDDs established that the Department of State has the responsibility for leading and managing the Foreign Emergency Support Team (FEST) and Consequence Management Response Team (CMRT) for WMD incidents, and that membership in the FEST/CMRT will include the capability for responding to nuclear, biological, or chemical threats in a consequence management cell.

As an independent federal government agency, USAID receives overall foreign policy guidance from the Secretary of State. As a part of USAID, OFDA's role in consequence management is to provide humanitarian assistance to victims or populations affected by a WMD event, to provide financial and/or technical support in characterization, remediation, and guidance to host nation (HN) and U.S. mission field personnel, NGO partners, etc., and to participate in interagency planning and exercises. OFDA takes an all-hazards approach to a WMD event.

The U.S. Government determines whether the WMD event was intentional or a natural event. If a large population movement is caused by threat of contamination, OFDA determines if the affected government infrastructure can or will be overwhelmed and unable to support the needs of the affected population. Further, OFDA determines the prevalence of contamination to the population and environment, whether medical response, isolation, and decontamination personnel and equipment are required, and if there is a perceived threat to the population.

OFDA can assist in the development of institutional relationships with technical cooperators through Interagency Agreements, coordinate with DOS/DOD and other agencies on consequence management (CM) planning, training, and exercises, conduct ongoing training programs, provide a cadre of responders and technical expertise, and can establish an equipment cache for contingencies.

United States Public Health Service's (USPHS) Agency of Toxic Substances and Disease Registry (ATSDR) and Center for Disease Control and Prevention (CDC) are responsible for chemical/radiological/biological training and response. These agencies conduct embassy and mission chemical profiling, assist in the preparation of chemical,

biological, radiological, and nuclear (CBRN) annexes, and provide chemical and radiological hazards training modules.

Some of the most recent OFDA consequence management related responses were Djibouti 2002, Dominican Republic 2002, El Cajon 1999, Nipa Virus 1999, Nairobi 1998, and Lake Nyos 1986.

So, in summary, the foundation is here. I was very pleased to hear about the military and civilian exercises that take place, and you are certainly to be lauded for the kind of cooperation and initiatives that you have already taken.

Environmental Post-Conflict Assessments: A New UN Tool Developed by UNEP

**Mr. Pekka Haavisto
Chairman of the Afghanistan Task Force,
United Nations Environment Program**

Military conflicts always bring human suffering, but what do we know about their environmental consequences? What risks do they pose to human health and the recovery process, and how can the environment be integrated into reconstruction efforts? Since spring 1999, the United Nations Environmental Programme (UNEP) has been working in areas of the world where the natural and human environment has been damaged as a direct or indirect consequence of conflict. The focus has been on investigating the environmental impacts of conflicts, recommending strategic priorities for cleanup and remediation, and strengthening the capacity of authorities for environmental management and protection, as well as catalysing and mobilising international support for environmental projects.

In February 2003, activities underway by UNEP included, among others, desk studies and field missions in the Occupied Palestinian Territories, in Afghanistan, and in Bosnia-Herzegovina. Post-conflict assessment work began in UNEP in 1999, in the Balkans region, to determine the environmental risks of the Kosovo conflict, to prioritise urgent needs for cleanup and remediation, and to take practical steps to raise financial resources to address the concerns identified in the UNEP post-conflict environmental assessment. UNEP's activities in the Balkans now cover Kosovo, Serbia, Montenegro, Macedonia, and Albania. In Autumn 2002, a new assessment of the use of weapons with depleted uranium (DU) was launched in Bosnia-Herzegovina, where DU remains a concern even seven years after the Bosnian war ended.

The positive reactions to the work conducted by UNEP in the Balkan countries led to the establishment of the UNEP Post-Conflict Assessment Unit (PCAU) in 2001, when the pioneering work in the Balkans was extended to other conflict-stricken areas of the world.

As a result of the experience gained through the practical and action-oriented environmental assessments, a framework and approach has evolved. In order to develop further environmental assessment as a new tool for the international community in tackling both pre- and post-conflict situations, a full understanding of different types of conflict-related environmental risks is required. Guiding principles in the development of the practical assessment and cleanup work have been the deeper analysis of the reasons of the conflicts and a better understanding of the different kind of environmental impacts, taking into account the changing character of contemporary conflicts. The development of the new types of weapons and military strategies poses additional challenges to the protection of the environment during conflicts and in a post-conflict environmental assessment scenario. In particular, terrorism, and the recent global phenomenon of the counter-reaction of war against terrorism, presents a new challenge on how to address the environmental consequences of conflict at the global level.

Human Health and Biodiversity under Threat

Environmental risks are compounded by the fact that civilian and military activities very often take place in close locations, which are usually also in the middle of or near densely populated areas. The risks arising from chemicals are not limited exclusively to urban areas; chemicals can also be used as a weapon in rural areas, for example against guerrillas. One of the first cases of this kind was reported in Malaysia, where the British used herbicides for defoliation in the late 1940s and early 1950s. The most famous use of herbicides (e.g. "Agent Orange") occurred during the Vietnam War.

In many African conflicts, the fighting, the over-exploitation of natural resources for income to supply the fighting troops, and the huge flows of refugees have raised concerns about drinking water, sanitation, forests, and biodiversity. For instance, it has been noted that the various armed conflicts in Ethiopia have put the considerable biodiversity and natural resources and many endemic species under constant conflict-related risk through deleterious habitat modifications, such as destruction of protected area assets, deforestation, overgrazing, and soil erosion. Also, the civil war in Sierra Leone has been a topic of concern: related biodiversity studies have pointed out that, in addition to the traditional

causes of biodiversity loss, the civil war has become a new serious cause, both because of its own inherent destructive capacity and its domino effect. In Rwanda there has been concern over the impact of civil war on the conservation of protected areas.

Generating income for troops and military purposes is one side of “warlordism,” or the privatisation of wars. Whether it is the question of diamond resources in Angola or the illegal cutting of forests in Afghanistan and in South-East Asia, one of the driving forces behind the overexploitation of natural resources is to provide military funding.

Destruction of the environment on purpose as an act of war was seen in the Persian Gulf War in 1991, when the Iraqi troops intentionally set fire to the Kuwaiti oil wells. These burning oilfields and the consequences of the oil leakages remain a long-term environmental concern for the Kuwaitis as well as for the international community. The process of providing compensation for this environmental damage is ongoing under the United Nations Compensation Commission (see <http://www.uncc.ch>). Environmental concerns have also been raised with regard to ongoing conflicts. A case in point is the civil war in Columbia, where chemicals are being employed for the destruction of drug cultivations, and in Chechnya, where the destruction in towns and villages has also led to environmental concerns.

Sources of Environmental Damage

At the general level, a fundamental aim of UNEP’s environmental post-conflict assessments has been to offer a new tool for the international community to assist countries and regions in their post-conflict recovery and reconstruction period. As a significant “by-product,” this also helps to build awareness on consequences and costs of military conflicts that are not immediately obvious. Modern warfare has associated environmental impacts that appear in various ways and with different time lags. Conflicts can lead to a complex array of direct and indirect environmental impacts that can be characterised as being immediate or delayed, temporary or persistent, localised or transboundary.

From this perspective, a useful way to grasp analytically the broader issue of environment and warfare is to concentrate on the different possible environmental risks in military conflicts. Different types of action lead to different risks, and the objects under threat vary accordingly. The possible pre-, during- and post-conflict protection and cleanup activities also vary according to the nature of the assumed risk. In general, pre-conflict preventative action ought to be guided by learning from the sometimes-painful lessons of earlier conflicts, and plans should be made accordingly to safeguard people and the environment in the regions where a military conflict is impending. During conflict, efforts should be focussed on minimising the effects for people and the environment. Post-conflict measures range from humanitarian assistance and the safe return of refugees and internally displaced persons (IDPs), to cleanup, reconstruction, and capacity building.

Environmental impacts can be caused by many factors. They range from destruction of industrial sites to impacts of refugees and military troop movements. As an additional group, the impacts caused by boycotts or sanctions adopted by the international community might, in some cases, lead to environmental consequences, for instance by causing extra strain on certain (sanction-free) types of transport or by directing certain prohibited industrial production—and related imports and exports—beyond the reach of normal controls, and thus outside of the official environmental norms and regulations. Import restrictions on state-of-the-art technologies can also put limitations on the technologies used for environmental protection, including the limiting of polluting emissions from cities and industries.

In figure 6-2, these impacts are further analysed by presenting possible risks as well as suitable protection and cleanup methods, respectively. A connecting factor between movements and camps of military forces and those of refugees, as well as the targeting of vulnerable natural sites, is the risk posed to biodiversity. In such cases, the most suitable type of mitigation action—in addition to preparedness, risk identification, and other pro-active measures—includes cleanup and protection of the soil and groundwater, as well as waste and sewage treatments.

Type of Action	Risks – object under threat	Protection – Cleanup
Destruction of industrial sites, civil or military	Oil and chemical risks, nuclear risks	Evacuation, decontamination, cleanup of polluted sites, protection of groundwater and surface waters
Direct targeting of environmental resources, including forests, water, and food supplies	Biodiversity, protected species, nature, agricultural products	Rehabilitation programmes, quality control of water and food supplies
Use of conventional weapons	Traditional risks of warfare (increased when targeting nuclear, biological, or chemical facilities)	Preparedness, evacuation, cleanup
Use of non-conventional weapons	Risks of nuclear, biological, or chemical damage of the weapons used	Preparedness, evacuation, civil protection, decontamination
Use of new type of weapons: - Depleted uranium (DU) - Cluster bombs (CB) - Fibre bombs (FB)	Ongoing risk evaluation. DU: radiological and toxicological risks; CB: biodiversity risks, future of nature areas; FB: PCB risks from burning transformer stations, slowing the returning of the refugees	Cleanup of polluted sites, destroying unexploded ordnance, informing the local population of the polluted areas
Use of landmines	Heavy metals in nature, risks to the everyday life of civilians after the conflict, limits the use of the areas (like forests and agricultural land), slowing the return of refugees and IDPs	Mine-clearance, mine-awareness campaigns
Use of environmental resources by refugees and displaced persons, movement of refugees, refugee camps	Biodiversity, groundwater, surface waters	Good sound planning, waste and sewage treatments, provision of fire wood supplies, subsequent cleanup afterwards
Use of environmental resources to finance military operations	Biodiversity, forests, desertification	International monitoring and control, code of conduct
Troop and vehicle movements, military camps	Oil and chemical risks, groundwater, damage to biodiversity	Identification of risks in advance, preparedness, protection of groundwater, “greening the armies”
International trade in goods and services, or flight sanctions, boycotts	Use of old technologies, slow down of cleanup processes, isolation from international environmental co-operation	International monitoring of impacts and related control checks, “clever” sanctions or boycotts

FIGURE 6-2: FACTORS CAUSING ENVIRONMENTAL IMPACTS

From Desk Study to Field Mission

The UNEP Post-Conflict Assessment Unit works with a global scope to investigate environmental impacts of conflicts and pre-existing chronic environmental problems. The unit's work includes identifying risks to human health and environment, recommending strategic priorities for cleanup and remediation, and promoting an environmental agenda and regional environmental cooperation. In doing so, it strengthens the capacity of authorities for environmental management and protection, catalyses and mobilises international support for environmental projects, and integrates environmental considerations into the recovery and reconstruction process.

UNEP's approach is to demonstrate the linkages between environmental degradation, public health, and sustainable development in order to identify risks and promote sustainable resource use. When possible, assessments are carried out using a combination of international and national experts and UNEP's in-house specialists in order to share knowledge, build local capacities, and ensure recommendations reflecting local circumstances and realities. When needed, laboratory analysis and computer-aided geographic analyses are carried out using state-of-the-art equipment and techniques. Following assessment activities, a series of workshops and seminars are provided to help build capacity for environmental management and protection and to ensure that environmental considerations are integrated into the reconstruction and recovery process.

Typically, the process consists of four different phases, although the design of each activity is adjusted to suit the particular special features of the situation in question. Figure 6-3 illustrates the phases of environmental post-conflict assessment in detail. The outcome of the first phase is usually a publication in the form of a desk study or feasibility study. The study collates and gathers the key information, for instance on the targets of military operations, quantity and type of weapons used, and environmental sensitivities. This first phase also identifies the main actors with regard to impacts and remedial steps: the key stakeholders, related institutional arrangements, and possible refugees and IDPs. This information serves as the foundation on which the next phases of the operation can be built.

One or several field missions generally follow, at the location of the conflict itself, to investigate firsthand the situation on the ground, to carry out interviews with local experts and populations, or to carry out scientific sampling of key environmental indicators. In some cases, these have occurred immediately after the conflict (UNEP mission to Kosovo in 1999 or to Afghanistan in 2002), in other cases, during the conflict (UNEP activities in the Occupied Palestinian Territories 2002) or one or more years after the conflict has ended (depleted uranium missions in Kosovo in 2000, in Serbia and Montenegro in 2001, and in Bosnia-Herzegovina in 2002). The field missions draw upon senior scientific and environmental experts, and they are planned in close collaboration with responsible authorities and local experts as well as any key UN and other institutional partners already active in the region in question. In most of the assessments carried out so far, samples are collected during the visits

Phase I: Desk Study	Phase II: Field mission	Phase III: Reporting	Phase IV: Implementing
<p><i>Collect and evaluate information on:</i></p> <ul style="list-style-type: none"> - Targets hit and chemicals released - Quantity and type of weapons used - Environmentally sensitive areas - Ongoing environmental projects - Refugee flows - Institutional arrangements - Key stakeholders 	<p>Recruit scientific experts with skills needed to address issues identified by desk studies</p> <p>Plan mission in collaboration with responsible authorities, local experts and UN agencies</p> <p>Visit key sites identified in desk studies</p> <p>Collect and analyse e.g., air, soil, water, and vegetation samples</p>	<p>Use sample results and complementary data to identify key “hot spots” —sites that pose significant risks to health and environment</p> <p>Identify key environmental challenges</p> <p>Develop strategic recommendations for:</p> <ul style="list-style-type: none"> - Urgent environmental actions and priorities - Clean-up and remediation at the ‘hot spots’ - Improving institutional capacity 	<p>Provide technical assistance for clean-up and remediation activities (i.e. best practice)</p> <p>Raise awareness and support for assistance</p> <p>Conduct feasibility studies at ‘hot spots’</p> <p>Conduct workshops and training on:</p> <ul style="list-style-type: none"> - Hazardous waste management - Multilateral environmental agreements - Local environmental action plans - Emergency preparedness

FIGURE 6-3: THE PHASES OF ENVIRONMENTAL POST-CONFLICT ASSESSMENT

to the sites. The analysis of air, soil, water, vegetation, and other collected samples takes place subsequently, in several highly ranked laboratories in different countries. Diversity is sought in the choice of analysing laboratories to provide greater impartiality and weight to the results.

The third phase—that of reporting—follows the field mission; in this phase, the focus is on distilling the essence of the scientific findings into a readable and pragmatic format accessible to policy-makers and key local and international stakeholders. Translation into appropriate languages, including other than the official ones of the United Nations, ensures that the report is accessible also to those who will ultimately be involved in any implementation activities.

The key findings and recommendations of the report provide the guidelines for the final phase, namely the implementation of short-, medium- and long-term recommendations. These activities include, *inter alia*, the provision of technical assistance for cleanup and remediation activities, the raising of local and international awareness, the carrying out of further studies on “hot spots,” and the arranging of workshops and training.

Experience from the UNEP Post-Conflict Activities

The UNEP post-conflict activities started with its task force in Kosovo in 1999, after the Balkan wars. Since then, the focus of the work has expanded to include other areas of the world. In November 2002, UNEP had ongoing post-conflict activities in Afghanistan, in the Occupied Palestinian Territories, Bosnia-Herzegovina, in the Federal Republic of Yugoslavia (FRY), and in Albania. All of these operations have been funded outside of UNEP’s regular budget, by voluntary pledges from donor countries (figure 6-4).

Kosovo Conflict: Oil leakages and Chemical Risks

During the spring of 1999, when the war in Kosovo was still ongoing, environmental sensibilities worldwide were shocked by images of burning oil refineries in Pancevo and Novi Sad, of oil products and chemicals leaking into the Danube River, and of biodiversity sites being targeted in the Federal Republic of Yugoslavia. The conflict in the Balkans has given rise to a revamped discussion about modern warfare and its

Activity	Years	Scope	Budget (USD millions)	Donor countries	Follow-up
Environmental Assessment after Kosovo conflict + Feasibility Study	1999-2000	War damage in Kosovo, Serbia and Montenegro	2.2	Austria, Belgium, Czech Republic, Denmark, Finland, France, Italy, Netherlands, Norway, Sweden, UK	Cleanup activities at "hot spots"; environment as part of humanitarian assistance; environment as part of the Stability Pact for South-Eastern Europe
Cleanup at four "hot spots" in Serbia	2000-2003	Clean-up of polluted soil	12.5	Finland, France, Denmark, Germany, Ireland, Luxemburg, Netherlands, Norway, Sweden, Switzerland	Environmental capacity building for local authorities; preparing of UN guidelines for environmental post-conflict cleanup
Macedonia assessment	2000-2001	Refugee flow from Kosovo; long-term environmental degradation	0.55	Netherlands	
Albania assessment + Feasibility study	2000-2002	Refugee flow from Kosovo; long-term environmental degradation	0.98	Netherlands, Sweden	Cleanup of one "hot spot" (Sharra landfill); possible further action by World Bank and donors
Depleted uranium assessment in Kosovo	2000-2001	Use of depleted uranium during Kosovo conflict	0.2	Switzerland	Recommendations for UNMIK, KFOR, and Kosovo authority
Depleted uranium in Serbia-Montenegro	2001-2002	Use of depleted uranium during Kosovo conflict	0.2	Switzerland	Recommendations to FRY authorities; verifying ongoing cleanup activities
Afghanistan post-conflict environment assessment	2002-2003	Long-term environmental degradation	1.0	Canada, Finland, Luxemburg, Switzerland	Capacity building; integrating environment to reconstruction
Environment assessment in the Occupied Palestinian Territories	2002-2003	Environmental consequences of the occupation; environment as a bridge-building tool	0.2	Norway	(To be confirmed)
Depleted uranium in Bosnia-Herzegovina	2002-2003	Use of depleted uranium in Bosnian war 1994-95	0.2	Italy, Switzerland	Capacity building; recommendations for decontamination
United Nations Compensation Commission (UNCC)	2002-2004	Establishing a databank to assist UNCC's Environmental Panel when processing environmental claims of the Iraqi invasion and Gulf War of 1991	2.0	UNCC	

FIGURE 6-4: UNEP POST-CONFLICT ENVIRONMENTAL ACTIVITIES

environmental consequences. New types of weapons—such as cluster bombs and ammunition with depleted uranium—and the consequences for chemical facilities required new approaches to cleanup activities.

The Kosovo conflict was the first where the United Nations and UNEP took the initiative to undertake a post-conflict environmental assessment as quickly as possible. When the Kosovo war was still ongoing, UNEP took part in the United Nations Interagency Humanitarian Needs Assessment Mission of spring 1999. The UNEP Balkans Task Force started its fieldwork in summer 1999, just a few weeks after the conflict ended. More than sixty scientists from nineteen countries undertook four field missions, including visits to targeted sites, research work on the River Danube, sampling at biodiversity sites, and working on human settlements in Kosovo.

The Task Force submitted its report in October 1999, only five months after the conflict had ended. It concluded that pollution detected at four environmental “hot spots” (Pancevo, Kragujevac, Novi Sad, and Bor—all in Serbia) was serious and posed a threat to human health. It called for immediate cleanup action as part of humanitarian assistance to the region. But it also concluded that much of this pollution pre-dated the conflict and that there was widespread evidence of long-term deficiencies in treating hazardous waste. The team was welcomed in Pancevo—a few weeks after the end of the conflict—by some local non-governmental organizations (NGOs), with the words: “You are here at last! We have been waiting for you for ten years!” An independent environmental assessment was certainly needed. People had long suffered from different pollution-related diseases: the team learned of a special “Pancevo cancer”—liver cancer caused by petrochemicals.

The report broke new ground by making a clear link between the environment and humanitarian assistance. This was politically important because, in the summer of 1999, the FRY was still led by Milosevic, and many governments were unwilling to provide finance for any activities connected with reconstruction. However, the international community was willing to support the first cleanup activities in the area as part of humanitarian assistance. While during the conflict a major claim had been made by the FRY government about environmental destruction, after the war had ended, environment was no longer among the top

priorities in the country. Though technically the government could deal with part of the problem, much of it still required assistance from the international community.

A central thesis of the report was that local people working on reconstruction after a conflict are at serious risk when polluted sites have not been properly cleaned up. Typical problems at industrial sites include the risks of pollution near drinking water sources; the treatment or removal of surface soil contaminated with heavy oil, polychlorinated biphenyls (PCBs), heavy metals and other hazardous substances; and the demands of continued monitoring of air, water, soil, agricultural products, and human health.

At the four “hot spots”—Pancevo, Novi Sad, Kragujevac, and Bor—the level of contamination was very serious. At the Pancevo industrial complex, for example, a wastewater canal flowing into the Danube was seriously contaminated with sixty different chemicals, including dichloroethane (EDC) and mercury. At the Zastava car plant in Kragujevac, PCB and dioxin contamination urgently needed cleaning up.

UNEP’s recommendations distinguished between short-term actions aimed at immediate cleanup, and longer-term recommendations. The essential immediate action included detailed groundwater studies; remedial treatment or removal of contaminated surface soil; a detailed disposal plan, coupled with monitoring of air, water, soil, agricultural products and human health; and communication of these results to the local population. Site-specific recommendations as well as general recommendations on biodiversity, human settlement, and long-term institution building were also made. Feasibility studies and cleanup operations followed the assessment work, and a sizeable project undertaken by UNEP for the cleanup of polluted soil was still ongoing in the autumn of 2002 in Serbia. The cost of this cleanup project is estimated at 16 million USD; it is funded by voluntary contributions by donors. In addition to the “hot spots,” UNEP has been providing capacity building through workshops and training activities.

Depleted Uranium in the Balkans

Fieldwork conducted by UNEP after the Kosovo conflict showed that new types of weapons had been used. These included cluster bombs, which consist of plastic boxes containing several hundred bomblets that were dropped from planes. The usual targets are vehicles and especially convoys. When these had been in natural parks, many of the bomblets stayed unexploded in the trees or in the grass. The cleaning of these areas was difficult, and several accidents with cluster bombs occurred long after the conflict had ended. A second type of new weapon used was the fibre bomb, which had often been used at transformer stations or on main electricity lines. These do not explode, but they cause an electrical short-circuit severing the electricity service, which can also cause the burning of the transformer stations. Since transformers usually contain oil for cooling, the use of these types of weapon can cause oil leaks or combustion. In some cases in Kosovo and Serbia, the oil contained PCBs, the burning of which released substances such as dioxins.

But perhaps the type of new weapon used with the most complex environmental impacts was depleted uranium ammunition. Depleted uranium (DU) is a by-product of the process used to enrich natural uranium ore for use in nuclear reactors and nuclear weapons. There are multiple military applications of DU. As in the civilian sector, DU may serve as counter-ballast, in both aircraft and missiles. Not all counter-ballast is made of depleted uranium, and less DU is now used for this purpose than in the past. Because of its density and resistance to penetration by anti-armour munitions, DU can also be used in the armour of tanks.

During the Kosovo conflict, depleted uranium was used in the NATO air campaign, but both during and after the conflict, there was a lack of detailed environmental information about its use. In the autumn of 1999, UNEP visited several sites where DU had been rumoured to have been used, but at these sites, initial inspection revealed no indications of the use of DU. Consequently, a desk study of the impacts of the use of DU was carried out in Autumn 1999, which found that additional information from NATO would be needed to measure the impacts of DU after the Kosovo conflict.

It was not until the summer of 2000 that the United Nations received from NATO a detailed map of the sites where ammunition with depleted uranium had been used. This showed 112 targets, mostly in Kosovo, where, in all, more than 30,000 rounds of depleted uranium ammunition had been used. This is equivalent to nine tons of DU. UNEP was able to begin assessing the effects of depleted uranium in November 2000, almost one and a half years after the conflict. A team of fourteen scientists from several countries and from the International Atomic Energy Agency (IAEA) carried out the field assessment. The team carried out its work in close cooperation with the United Nations Mission in Kosovo (UNMIK) and the NATO Kosovo Force (KFOR). UNEP field missions visited eleven of the 112 sites that were identified as being targeted by ordnance containing DU. The UNEP team collected soil, water, and vegetation samples and conducted smear tests on buildings, destroyed army vehicles, and DU penetrators.

No higher-level ground contamination was found in the investigated areas. Therefore, the corresponding radiological and chemical risks were judged insignificant, even if the low-level contamination was widespread. There were a great number of contamination points in the investigated areas, but no significant risk was found related to these points in terms of possible contamination of air or plants.

One finding of the report was that it is highly likely that many penetrators are still lying on the ground surface; this has associated risks. If a fragment was put into a pocket or somewhere else close to the human body, there would be external beta radiation of the skin, leading to quite high local radiation doses after some weeks of continuous exposure. However, skin burns from radiation are unlikely. Remaining penetrators and jackets that may be hidden at several meters depth in the ground, as well as any on the ground surface, constitute a risk of future DU contamination of groundwater and drinking water. One interesting finding during the Kosovo DU mission was that the penetrators found and analysed do not only include depleted uranium, but very small amounts of transuranic elements like plutonium. This indicates that, in the production process of DU, materials or facilities are contaminated with materials of higher radioactivity.

Although the Kosovo mission findings showed no cause for alarm, the report describes specific situations where risks could be significant. There are also scientific uncertainties relating to the longer-term behavior of DU in the environment. For these reasons, UNEP called for certain precautionary actions. According to UNEP, this precautionary action should include visiting all DU sites in Kosovo, removing radioactive penetrators and jackets on the surface, decontaminating areas where feasible, signing and fencing areas that have not yet been decontaminated, and providing information to local populations on precautions to be taken if DU were to be found. During the Kosovo conflict, a few sites outside Kosovo, in Serbia and Montenegro, had also been targeted with ordnance containing DU. Following the precautionary approach advocated by UNEP and to reduce uncertainties about the environmental impacts of DU, it was evident that a second phase of scientific work would be needed to assess the impacts in these other areas.

This second phase started in September 2001 and was concluded in March 2002 with the publication of the report *Depleted Uranium in Serbia and Montenegro—Post-Conflict Environmental Assessment in the Federal Republic of Yugoslavia*. This report provided additional information and revealed important new discoveries on the environmental behaviour of DU.

For example, it was learned that, more than two years after the end of the conflict, particles of DU dust could be detected from soil samples and from sensitive bio-indicators like lichen. However, as the levels were extremely low, it was only through the use of state-of-the-art laboratory analyses that detection could be achieved. Based on the findings, UNEP could confirm that contamination at the targeted sites was widespread, though no significant level of radioactivity could be measured. Furthermore, during this assessment, through modern air sampling techniques, the UNEP team detected airborne DU particles at two sites. While all levels detected are still below international safety limits, these results add valuable new information to the scientific body of knowledge concerning the behaviour of DU and have important implications for site decontamination and construction works.

One of the most significant findings of the assessment is that future risks to groundwater may be posed by the gradual corrosion of

DU penetrators. While there are major scientific uncertainties related to the rate and scale of corrosion, and therefore the corresponding environmental and health impacts, monitoring is needed to ensure that targeted sites remain risk free. Based on the DU risks found in Kosovo and in Serbia and Montenegro, UNEP recommended a third study to be made in Bosnia-Herzegovina, where around three tonnes of DU was used during the Bosnian war from 1994 to 1995. A field mission to collect samples took place in October 2002, during which a total of fifteen sites were visited and measurements taken in Bosnia-Herzegovina, including Republica Srpska.

Slightly radioactive DU material was found on the surface a full seven years after the conflict, and at some locations, such as the Hadzici tank repair facility near Sarajevo and the Han Pijesak garrison in Republica Srpska, proper cleanup had not been carried out after the conflict. Depleted uranium dust could still be found in the targeted buildings that are currently in active use, and therefore, UNEP recommended as an immediate precautionary measure the decontamination of these buildings.

UNEP also conducted soil, air, bio-indicator and water sampling in Bosnia-Herzegovina to analyse the long-term consequences of the DU in nature. Two other UN organisations, the International Atomic Energy Agency (IAEA) and the World Health Organization (WHO) joined the UNEP mission to Bosnia-Herzegovina. The final report of the Bosnia-Herzegovina mission with conclusions and recommendations will be published by UNEP in March 2003.

In the spring of 2002, UNEP also participated in a DU mission by the IAEA to Kuwait to analyse the DU situation after the Gulf War of 1991. The amount of DU used during the Gulf War is much higher than in the Balkans. In Iraq and Kuwait more than two hundred tonnes of DU were used, whereas the amount was nine tonnes in Kosovo and three tonnes in Bosnia-Herzegovina.

Macedonia and Albania: Refugees and Environment

In September 2000 an international team of experts assembled by UNEP visited Albania and the Former Yugoslav Republic of Macedonia

to assess the environmental damage caused by the Kosovo conflict as well as the institutional capacity of the two governments to address environmental problems.

The issue of the impact of refugees was the main reason for carrying out a post-conflict environmental assessment. While Albania and the Former Yugoslav Republic of Macedonia were not the focus of fighting during the conflict, their natural environment was subjected to stress from hundreds of thousands of civilians who, fleeing the Kosovo conflict, crowded into refugee camps in this territory. In addition, before the study was conducted, it was expected that there might also be pre-conflict “hot spots” of industrial pollution that had since not received attention, as the governments concerned were confronted with enormous social and economic problems created by the conflict and its aftermath. Furthermore, one core area of concern in these assessments was the institutional capacities for environmental protection in Albania and Macedonia.

During the field missions, UNEP specialists met with local experts, and authorities visited sites and took samples, enabling the mapping of pollution sources and of seriously contaminated sites requiring urgent attention. A central finding of the assessment was that the most severe environmental challenges were caused by pre-conflict industrial pollution. In comparison, the refugee issue had relatively modest impacts.

UNEP identified five “hot spots” in Albania and Macedonia where swift attention was required to prevent further risks to human health and the environment. Some of the “hot spots” concerned industrial plants that had already been closed, while others were still operational and of importance to the countries’ economies. In Albania, UNEP recommended the development and implementation of risk reduction strategies. A second general recommendation called for strong leadership and sustained investment to support local environmental experts in addressing hazardous waste management, solid waste disposal, wastewater treatment, soil and groundwater protection, monitoring, and enforcement. In Macedonia, the two key areas needing improvement were the implementation of environmentally acceptable industrial processes and the adequate handling, storage, treatment, and disposal of waste.

With regard to the management of the environmental consequences of the refugee crisis, for both Albania and Macedonia, UNEP stressed the importance of government-based co-ordinating bodies with precise legal mandates, “life-cycle assessment,” the environmental guidelines of the Office of the United Nations High Commissioner for Refugees (UNHCR), funding of rehabilitation work for the areas with refugees, environmental technology, the campsite selection process, minimal or biodegradable packaging of food products and durable goods, and wastewater management. Site-specific recommendations were also given.

Concerning the institutional capacities for environmental management, the recommendations emphasised issues such as the responsibilities of the state, environmental awareness, management instruments, local authority and privatisation, waste management, water and air, chemicals, and biodiversity. In Albania, the initial assessment was later followed by cleanup feasibility studies at some of the “hot spots.” In November 2002, work continued on the cleanup of Sharra Landfill, which is the principal disposal site used by Tirana for municipal solid waste. It has operated for about nine years as an uncontrolled open dumpsite with constant open and deep fires burning.

Afghanistan: Thirty Years of Environmental Degradation

In the process of supporting the December 2001 Bonn negotiations, the international community made the commitment to support the Afghan Administration in achieving political stability, in reconstruction, and in the safe return of millions of Afghan refugees. The environment of Afghanistan is among the victims of the past three decades of conflict. During almost thirty years of conflict, the environment of Afghanistan has been heavily damaged due to military activities, refugee movements, overexploitation of natural resources, and a lack of management and institutional capacity. The drought between 1999 and 2001 has further added to this damage. It is estimated that Afghanistan has lost up to 30% of its forests since 1979, with less than 2% of the country remaining forested. Similar degradation has occurred with rangelands and watersheds and desertification of agricultural regions and a host of other environmental sectors. Furthermore, despite the biodiversity contained within the country, the six existing protected areas cover less than one percent of the land base.

The economic and social recovery of Afghanistan has to be based on the principles of sustainable development. Special attention should be paid to streamlining the environment into the humanitarian and reconstruction efforts in Afghanistan. This means integrating environmental considerations into all policy areas at all levels to ensure universal access to clean air, clean water, sanitation and solid waste disposal. For example, the safe return of refugees will be dependent on living conditions in both urban and rural areas. There are concerns that the returning refugees will stay in the urban centres due to environmental degradation in the rural areas, thus slowing the rural recovery of the country and creating more urban environmental problems. Environment protection, management, and remediation can also create job opportunities for urban and rural populations.

UNEP conducted an environmental assessment in Afghanistan to analyse the country's environmental conditions and to recommend projects to improve the environmental situation. The basic components of the assessment were field and remote sensing assessment of forests, wetlands, protected areas, and pollution "hotspots," supported by technical field missions and laboratory analyses when needed; strategic capacity assessment of environmental institutions; and international environmental conventions opportunities assessment.

The long-term aim of UNEP's activities was to ensure that environmental considerations are integrated throughout the reconstruction and recovery process and that adequate information is made available to make sustainable land and resource use decisions. Therefore, UNEP recommended the development of an environmental impact assessment (EIA) as a tool for all sectors in Afghanistan. UNEP also supported the development of environmental legislation in the country, including a proposal to include the right to a healthy environment in the constitution that is under preparation. UNEP integrated the Afghan administration and Afghan experts into all phases of the UNEP activities.

The final report of UNEP's environmental assessment of the country was published in January 2003. Five teams, totalling twenty Afghani and international scientists and experts, collected samples and examined sites around the country in the first-ever effort to assess how over two decades of conflict have affected Afghanistan's environment. The report

included the findings and recommendations of these five field teams that toured the country in September 2002. The report also contains the results of laboratory analyses of the samples taken and results of the desk studies on regional and international environmental co-operation.

Using a combination of field study missions and state-of-the-art remote sensing techniques, UNEP conducted a rapid strategic environmental assessment of forests and deforestation, wetlands, existing and potential protected areas, and pollution “hotspots.” Field mission activities included a combination of field site surveys, collection of background information, and interviews with government officials, NGOs, local people, and other relevant stakeholders. UNEP assessed existing institutions and provided recommendations for structuring the environmental administration based on Afghan needs and best international practices. Strategic recommendations were also provided for developing environmental laws and policies, sustainable management practices, and mechanisms for monitoring, enforcement, funding, and public participation.

The full results are available in a report published in January 2003, which recommends projects to improve or remediate environmental threats, improve the institutional framework, increase Afghanistan’s capacity for environmental management and protection, create jobs in the environmental sector, and improve the implementation of international environmental agreements. Capacity building and co-ordination form an integral part of UNEP’s post-conflict activities. In implementing recommendations of the report, Afghan experts will be integrated into all activities and necessary training will be provided.

In Afghanistan, which is recovering from a long period of conflicts, there is no structure or legislation for environmental protection. Also, very basic data on environment is lacking, co-operation between authorities has to be re-established, and regional level and local administration developed. Environmental administration must be built from scratch. Capacity building activities, therefore, have a high priority.

Afghanistan has also suffered from the regime of warlords, under which a source of income for the military groups has been the illegal timber trade from Afghanistan over the border to Pakistan. This has

resulted in the loss of forests and accelerated erosion and land degradation. The absence of countrywide forestry planning and a lack of sufficient tree nurseries and reforestation programmes, along with the severe drought, are major causes of desertification.

Palestine: Troubled Waters

In February 2002, in Cartagena, UNEP's Governing Council decided to launch a desk study on the state of environment in the Occupied Palestinian Territories (OPT) that would identify major areas of environmental damage requiring urgent attention. The Cartagena decision was motivated by the wish to investigate the possible environmental consequences of the occupation period, but also by a desire to try to use the environment as a bridge-building component between the parties involved. This desk study was completed in January 2003.

Initial concerns about the pollution of water, dumping of waste, loss of natural vegetation, and the pollution of coastal waters prompted the report to focus on issues related to water, waste management, land use, and environmental administration. While for the most part, recommendations of a general nature are made, the findings of the desk study also pinpoint environmental "hot spots" that require on-the-ground studies to establish likely impacts on the environment. Recommendations have been made on how areas of environmental concern can be improved, such as appropriate cleanup and disposal operations for wastes, which would be for the benefit of all the people in the area. Any subsequent field studies deemed necessary would have the objective of proposing remedial programmes to improve the environmental situation in the Occupied Palestinian Territories.

The findings of the desk study—the first phase of the operation—show that the occupation has had a range of environmental impacts, for instance, from the perspective of infrastructure and groundwater. Further, the occupation has led to the creation of an almost complete "double-infrastructure," one for use by Palestinians and the other for Israeli settlements. In addition to the separate and dual transport network, duplicate infrastructure exists for drinking water and waste treatment. Due to curfews that have prevented access to other towns

and parts of the Occupied Territories, the planning of the Palestinian Authority increasingly aims to provide basic services separately in each and every town. This kind of infrastructure is not only unsustainable and inefficient, but also very expensive to build and maintain.

The scarcity of water resources, pollution of the aquifers, problems of transporting waste to the existing landfills due to closure and curfews, illegal waste dump sites, illegal burning of waste, and the lack of treatment of hazardous waste or the low capacity of waste water treatment plants are among the topics addressed by the UNEP desk study. Since the outbreak of the second Intifada, which began in September 2000, the administrative contacts between Israel and the Palestinian Authority have decreased and are now minimal, which causes extra risks and damage to the environment. There is no functioning mechanism to address the issues of transboundary pollution between Israel and the Occupied Palestinian Territories.

There are numerous cases of transboundary pollution between Israel and the Occupied Palestinian Territories. In the very fragile situation in the region, questions also arise on the “geopolitics of environmental risks.” Many landfills and wastewater treatment plants are located extremely close to the border areas, an arrangement that puts environmental infrastructure at risk, which would be better suited to peaceful conditions. In the times of conflicts or hostilities, the access to these sites and their maintenance is limited, thus causing additional environmental concerns. Part of the transboundary problems in the area occurs from the Israeli settlements. There are political obstacles to any joint environmental projects between the settlers and the Palestinian Authority; this causes either a higher environmental load or a more expensive double infrastructure.

The amount extracted and the quality of groundwater has become a controversial *hydro-political* issue in the Middle East where the scarcity of the water is a key political factor. Disagreement over the allowed pumping quantities is a phenomenon that has also caused disputes between Lebanon and Israel. In Gaza, the tentative findings give reason to assume that future use of the groundwater of that area is limited, as water quality has suffered from over pumping, intrusion of salty seawater to the aquifers, and pollution by pesticides and other chemicals. The alternative

way of obtaining drinking water through desalination of seawater leads to very high energy costs, and subsidies will be needed. Rising prices of water will increase costs of agricultural products, and a higher water price will also become a social issue in the region. The various political aspects of the water question will keep the environmental issues highly topical far into the future.

If something positive can be seen in the current situation, it is, perhaps, the strong interest of all parties in the water. A sign of this is that Israelis and Palestinians have signed a declaration to try to keep water out of the current Intifada. Maybe based on this kind of real common interest, water and environment could be used also as a bridge-building tool in the Israeli-Palestinian conflict.

Conclusions: Green Wars or No Wars?

The UNEP post-conflict environmental assessments show that, after a political and military crisis, there is almost always an environmental crisis. The central lesson to be learned is how to manage the environmental crises after conflicts in the most comprehensive and rapid way to minimize the risks for human health and the environment. Taking care of the environment—and, concomitantly, of human health and sustainable development—should be one of the first actions undertaken by the international community.

Furthermore, better knowledge of environmental rules and constraints for modern warfare is required. The awareness of the environmental impacts of conflicts is evidently steadily growing. When political decisions are made at the international level on the use of military force in crises, the environmental consequences and the related costs are increasingly becoming a factor that must be taken seriously. What has already been observed is that environmental information has been used to build political argumentation concerning a forthcoming or past conflict. Herbicides and the burning oil fields in past conflicts still causes debates.

One central feature of the new (post-modern, privatised, unofficial, degenerated) wars, as some label them, has been the increasing difficulties in distinguishing between civilians and soldiers. It is widely known that,

during the Kosovo conflict, Serbian soldiers or paramilitaries were using civilian clothing, vehicles and buildings as a deliberate part of their tactics. In addition to the obvious risks to and suffering of the civilian population, from an environmental perspective, this “convergence” of civilians and military may also have other serious impacts. The findings of UNEP operations in the Balkans show that bombing of vulnerable natural sites—like protected national parks—has taken place as a result of military units using them as shelters. As a result, risks to biodiversity are unavoidable. Other general findings in this context have been that using civilian buildings as military storage sites or shelters can lead to targeting of sites located very close to inhabitants. Oil and chemical products are usually used both for civilian and military purposes. These industrial facilities are usually located near other industrial and densely populated areas. In addition, chemical risks are likely to occur when industrial sites are used for the production of military material. The immediate risk is even bigger when such sites are located in the vicinity of residential areas.

With regard to the new types of conflicts, the open question remains: In the end, whose fault are the environmental consequences—is the bomber to blame or the soldiers hiding in civilian sites? International legal agreements do not always offer unequivocal answers to the dilemmas the environmental perspective might raise.

For instance, in Pancevo and in other Danube areas, the lesson has been that the chemical impacts during conflicts, for example the bombing of chemical plants, will affect primarily the civilian population. Furthermore, there seem to be considerable deficiencies in international law concerning the treatment of chemical industrial facilities in military conflict situations.

Concerning the new types of weaponry, such as depleted uranium, in its post-conflict environmental assessments, UNEP continues to call for action based on the precautionary principle. In addition to these findings and ongoing studies, closer investigations and laboratory analyses are needed. This is the case especially concerning groundwater in the context of depleted uranium, where it is necessary to clarify the question of the possible links between groundwater, the food chain, and food production. Generally, the findings on depleted uranium will

continue to cause pressures to regulate the use and production of new and unconventional types of weapons.

The UNEP post-conflict environmental assessments have clearly shown that all environmental damage is not caused by the conflict; there might be a long legacy of pollution—for instance, from the industries in the Balkans—or just overall environmental degradation—like the illegal cutting of forests and collapse of the irrigation systems in Afghanistan. In post-conflict environmental studies, the whole environmental history of the region should be included.

Based on the lessons learned, will the wars of the future become greener? The only way to minimise environmental and health risks is through stricter regulations of warfare by limiting possible targets or types of weapons used.

Damage caused to the environment is only an additional negative result of the warfare, additional to the ones that are already well known: human casualties, refugee problems, damage to infrastructure, and huge recovery and reconstruction costs. Adding environmental costs to this long list of negative consequences of conflicts and wars should make it even more attractive to look for nonviolent alternatives to conflicts.

No wars are better than green wars.

All the UNEP reports mentioned are available at:

<http://postconflict.unep.ch>

Photos/maps available at:

<http://postconflict.unep.ch>

Existing Qatar and Gulf Cooperation Council Organizations and Mechanisms: Protection of the Environment

Mr. Khalid Al-Ali
Secretary General,

Supreme Council of Environment and Natural Reserves in Qatar

In the name of God, the Merciful, the Beneficent, peace be upon you.

Ladies and Gentlemen, my brothers, I would like to thank you for being in Doha and for your interest in learning the steps Qatar is taking to protect the environment.

I will discuss the roles and objectives, major water and air monitoring programs, and environmental tracking and assessment mechanisms of The Supreme Council for the Environment and Natural Reserves (SCENR). I will review the law strengthening the Council's ability to respond to an environmental incident; the Council is the State of Qatar's lead agency.

The SCENR was established in July 2000 by Law Number 11 of the year 2000, with four major objectives: to protect the environment through sustainable development, to conserve wildlife, and to protect their natural habitats, create public awareness, and develop human resources through training programs. These objectives are implemented through a number of sections and centers within the Council. The Council uses a three-legged approach to environmental management, which is a continuous process (figure 6-5). First, the Council determines

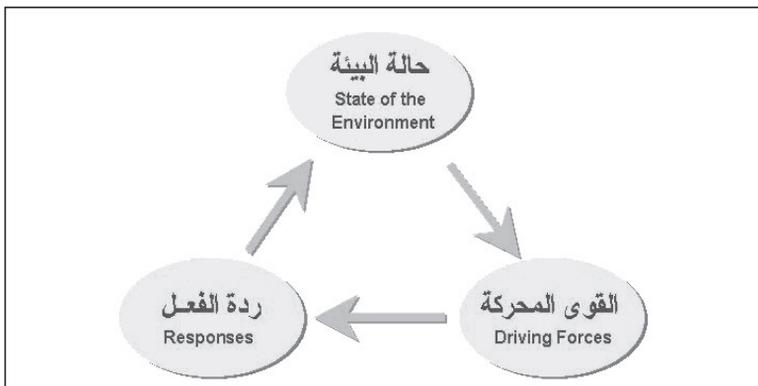


FIGURE 6-5: ENVIRONMENTAL MANAGEMENT METHODOLOGY

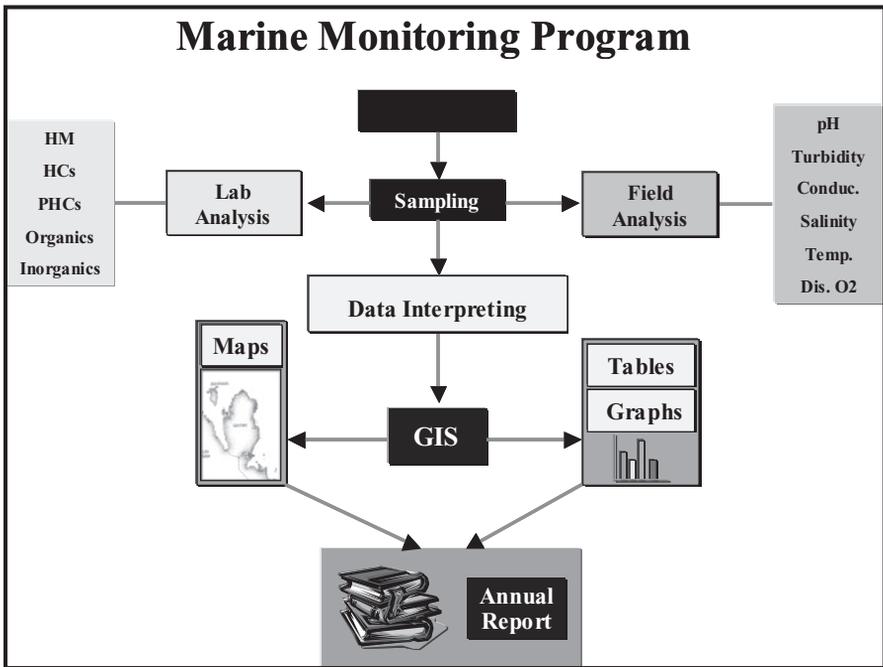


FIGURE 6-6: MARINE MONITORING PROGRAM

the current state of the environment, the driving forces causing change (if any), and then determines and implements responses to mitigate the effects of the change if needed.

I would like to discuss some of the programs of the SCENR. The Council conducts continuous environmental monitoring of Qatar's coastal waters. The Council gives special attention to the marine environment because it is an important source of food (7,139 metric tons of fish/year), the main source of desalinated drinking water (22 million gallons/year), which is important for the development of the country, and it is a historical and cultural symbol. The program includes approximately fifty monitoring stations covering the area from the Khor-Alodaid to Salwa, through the cities of Mesaieed, Al-Wakra, Doha, Al-Khor, and Ras-Laffan. Samples are taken from seawater at different depths and from the sediments. Each monitoring station conducts a field analysis and sends a sample to a lab for additional analysis. The data is interpreted, compared to historical samples, and published in an annual report (figure 6-6).

The SCENR's Air Quality Management Unit is implementing a two-phase ambient air quality-monitoring program. Phase I of the program consisted of installing five fixed stations and one mobile station in Doha and Al-Wakra cities. All the stations are connected to a central computer in the SCENR for simultaneous monitoring. Phase II, when completed, will connect all the stations within the industrial cities to the SCENR network. The stations gather air quality samples for levels of pollutants to include, nitrogen oxides (NO_x), sulfur dioxide (SO_2), ground level ozone (O_3), carbon monoxide (CO), hydrocarbons (HC), and inhalable particulate matter (PM-10).

The SCENR developed the Environmental Site Assessment and Management System (ESAMS). ESAMS is a comprehensive system for supporting decisionmaking by using the geographic information system (GIS). The system produces a detailed analytical report for the available environmental information, which is grouped in fifteen information categories including, ground water, geological composition, urban growth, distribution of farms, and sensitive areas. The ESAMS system was awarded the best application prize in the first workshop for teaching GIS in the Middle East.

The SCENR is responsible for controlling and monitoring the import, export, and use of chemicals and radioactive substances in Qatar. The SCENR developed a database containing information on more than 10,000 chemical materials. The database includes the chemical and common names, chemical abstracts service (CAS) number, usage data, quantities imported, and previous and present dates of importation. The SCENR maintains this information on 530 private and governmental organizations importing chemicals, including the company name, address, main activities, location of their storage facilities, and types and quantities of all chemicals imported.

One of the programs developed by the SCENR was the Environmental Impact Assessment (EIA). This program was adopted and applies to all development projects. The assessment consists of a series of inspections to determine if the development is within the current pollution guidelines (figure 6-7). If the development is not in compliance, the inspector issues a pollution non-conformity report (NCR) and develops agreements on corrective action. The inspector conducts follow-up inspections to

Environmental Impacts Assessment EIA

A comprehensive EIA system has been built and was discussed with all concerned parties in the state. This system has also been adopted and applied to all development projects.

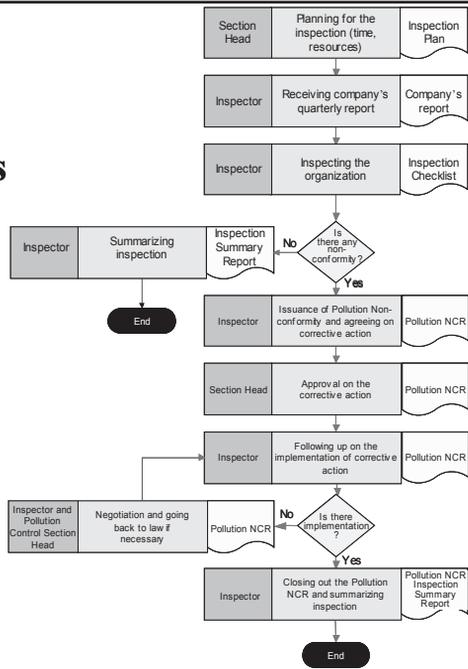


FIGURE 6-7: ENVIRONMENTAL IMPACTS ASSESSMENT

ensure corrective actions were taken. If so, the inspector completes the pollution NCR summary report.

The company must submit an application for consent to operate with the EIA section. An inspection is conducted to check that all conditions are met. After successful completion, the EIA section issues a clearance letter with needed conditions (if any exist). Environmental clearance is issued to companies only after their expected releases to the environment are modeled using the current U.S. EPA approved ISC3 model and Qatar meteorological data for dispersion.

The SCENR is also responsible for monitoring waste management. The SCENR grants approval for all chemical wastes disposed of by any industry. SCENR also recommends whether hazardous waste is stored on site or disposed of to a facility outside Qatar. Presently an incineration facility is available for clinical waste.

The SCENR’s Environment Monitoring Program (EMP) requires a quarterly report from every major company on the quality and quantity of gaseous, liquid, and solid waste released during the quarter.

Companies are required to report accidental and planned releases, to include the reason and corrective action in the case of accidents. SCENR must report all chemical releases into the Gulf, as a part of oil and gas production, every six months to the Regional Organization for the Protection of Marine Environment (ROPME). The ROPME Secretariat assesses the total releases from all countries in the ROPME Sea Area.

The SCENR reviews and provides input in the development of environmental regulations and laws, such as the Qatar Environment Protection Law, Environment Impact Assessment Law, Law on the Control of Ozone Depleting Substances, Law on Trading in and Dealing with Endangered Fauna and Flora, Law on Hunting Wild Animals, Birds, and Reptiles, and Law on Dealing with Radioactive Materials.

Qatar has taken positive steps to improve the functioning of the Council by passing a law that describes the functions of the General Secretariat. The functions are outlined in Section 4 of the law:

- Article 2 requires the Secretariat to identify, evaluate, and follow up incidents of environmental pollution, set up emergency plans, and take necessary steps to mitigate the effects of environmental catastrophes.
- Article 25 requires that the Council, in coordination with the concerned authorities in the State, establish an emergency plan to face and handle environmental catastrophes. The Council is responsible for collecting data (both local and foreign) on how to deal with catastrophes, to evaluate capabilities locally, regionally, and internationally before adopting the best method, and to organize and run training courses and drills in order to know the extent of readiness in the event of a catastrophe.
- Article 26 requires the Council to identify different types of catastrophes, including radiation fallout, to establish a Central Operations Room, and to form a working group to follow up operations dealing with a catastrophe.

The SCENR has established international linkages to enhance its ability to respond to an environmental catastrophe; these include: Human and Environmental Affairs Sector, GCC Secretariat; Kuwait

Convention on the Protection of the Marine Environment (ROPME); GCC and Iran; Council of Arab Ministers Responsible for Environment (CAMRE); Arab Countries; and the United Nations Environment Program (UNEP).

The SCENR is the national point of contact for the various international conventions and agreements to which the State of Qatar has become a party, such as the UN Framework Convention for Climate Change, UN Convention for Biological Diversity, UN Convention for Combating Desertification, International Convention on Trading in Endangered Species (CITES), Convention on Transboundary Movement of Hazardous Waste, Vienna Treaty for the Protection of the Ozone Layer, and the Kuwait Convention for the Protection of the Marine Environment.

In conclusion, our goal is a Qatar clean and green. Thank you.

Multilateral Approaches to Consequence Management—A Medical Perspective

**Brigadier General (Doctor) Mohammed Al-Abbadi
Director, Field Medicine, Royal Jordanian Medical Service**

Thank you very much. It is my pleasure to be with you here today and to share with you some of the medical viewpoints on response to emergencies. First of all, I would like to thank our Qatari hosts and the Qatari Armed Services for their kind invitation for me to come and speak today.

Today I will discuss multilateral approaches to consequence management from a medical perspective, focusing on the management of a multiple casualty incident (MCI). First I need give a couple of definitions to provide a common ground. A disaster is, “a sudden catastrophic event that overwhelms natural order and causes great loss of property and or life.” An incident management system is, “a written plan to help control, direct, and coordinate emergency personnel and equipment from the scene of a multiple casualty incident (MCI) to the transportation of the patients to definitive care.”

To talk about MCI management, we have to talk a little bit about some of the principles of MCI management. Medical response and other emergency services are part of MCI management. Proper MCI management ensures that there is enough and proper care available during the disaster. The overall site manager ensures emergency vehicles are properly positioned and that transporting patients is accomplished efficiently. The last part of MCI management for patient care is ensuring that adequate follow-up care is provided. In fact the general principles are the same and could be applied in all cases with some variations.

There are common objectives involved to ensure and maintain efficient MCI management. The most important one is to conduct thorough preplanning to minimize the negative effects of the disaster. The medical incident manager needs to possess the ability to quickly implement a plan and to fully use emergency personnel as they arrive on scene. The plan must have the ability to adapt to meet special conditions

and must avoid simply relocating the disaster from the scene to the local hospital. Conditions will continue to change; therefore, it is important to continue to monitor and analyze the situation and to change the plans accordingly when necessary. The plan must include contingency plans if a local hospital is unavailable or shelters are needed for the homeless due to the disaster.

Upon arrival at the scene, the Medical Incident (MI) Manager needs to establish a readily identifiable Command and Control Center. The personnel manning the center needs to consist of individuals who are known, respected, and experienced in disaster assistance. The team should include representatives from the various organizations who are familiar with their roles, the equipment, capabilities, and any unique requirements. These personnel need the authorization to make decisions. In the case of disasters, it is very difficult to go back to people in authority and wait for their decision. As stated in Professor Erdik's presentation and reinforced during Dr. Mosleh's presentations, "waiting for a decision causes delay and saving the lives of individuals depends a great deal on rapid response." The Command and Control Center's personnel should know the capabilities and locations of surrounding hospitals.

The MI manager has many responsibilities in addition to establishing the Command and Control Center. The manager must conduct an assessment of the scene using the acronym ETHANE: exact location of the disaster, type of incident, hazards, access to the site, number of victims, and emergency services needed to respond. Communications is very important to facilitate the coordination among the various organizations involved at the site, such as the police, civil defense, military personnel, and medical staff. The staffs must have the capability to communicate horizontally and vertically among the officials of the MCI sectors, as well as between themselves and their own higher authorities, to include the police, fire brigade, ambulance services, and hospitals. Coordination of services among these bodies is very important to achieve effective management. The MI manager appoints a triage officer in charge of the triage team at the site. The MI manager determines what treatment will occur at the casualty treatment station and the level of treatment for casualties being transported to higher levels of care. The MI manager determines the types and amount of transport required for the movement of personnel and casualties from the scene. The MI manager

is responsible for managing the various MCI medical sectors: treatment sector, transportation sector, staging sector, supply sector, triage sector, extraction sector, and the mobile command sector.

I am not going to discuss the various sectors in great detail, however I will focus on the triage officer and his or her team. Triage is a system used for sorting patients to determine the order in which they will receive medical care or transportation to definitive care. It is a dynamic ongoing process that is repeated at different levels of the medical care system. The goals of triage are to assess the patient's condition, determine the medical urgency, assign a priority to treatment, and then transport to suitable medical facilities. The objective of this exercise is to move the casualties to the right place at the right time and to make the best use of the available resources.

The principles of triage are to accomplish the greatest good for the greatest number of injured people in each special circumstance, to properly manage the patient whose condition requires rapid evaluation, to reduce the time lapse from initial injury to definitive care, to prevent unnecessary suffering and to improve morale, and to realize the need for and benefits of rapid medical evacuation of casualties—to save life and limbs. You might find somebody who is badly injured and cannot be saved even if he is transferred to the medical services. This kind of casualty is called an expectant priority. Even though the injured is still alive, the injury is of such an extent that you know there is no chance of saving his life. This type of injury will use up a lot of the resources that might be used to save a large number of people.

The key concepts of triage are, to remove patients from a dangerous area regardless of their injury, to limit treatment for those awaiting triage to airway management and control of severe bleeding, and if any rescuer breaks down or becomes hysterical during the operations, to evacuate that rescuer to a hospital.

In the Jordanian Medical Services, we use a four category tagging system (figure 6-8). The labeling system should be easy to understand, standardized, highly visible, waterproof, easy to attach, difficult to remove, easy to change the triage category in either direction, easy to fill

in (casualty details) rapidly, and have a space for serial observation and for trauma scoring.

This is a changeable and repetitive operation, and it uses color codes. First priority assistance (Urgent Category) is red, Delayed Category is yellow, Minimal Category, where assistance may be delayed somewhat, is Green, Expectant Category, which I mentioned above, where the injured is not expected to survive, is black.

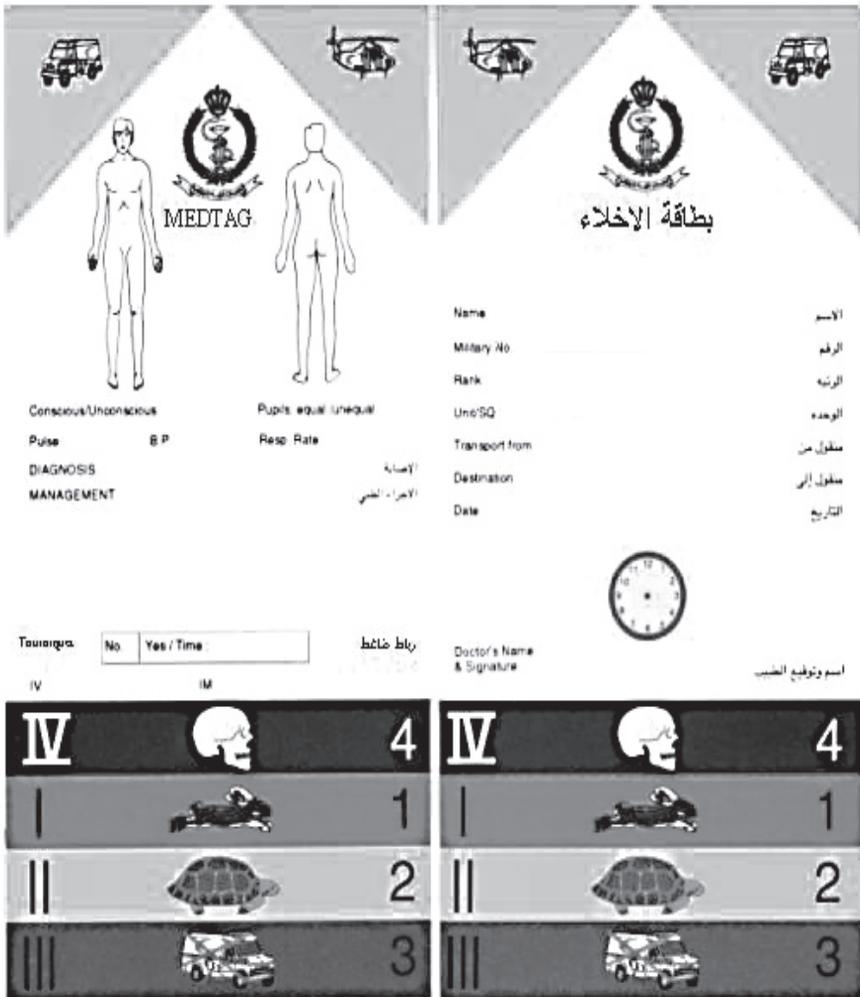


FIGURE 6-8: TRIAGE TAGGING SYSTEM

I would like to take a few minutes to describe each category.

- a. Urgent Category (red) requires urgent intervention if death is to be prevented. Examples are asphyxia, respiratory obstruction from mechanical causes, sucking chest wounds, tension pneumothorax, severe internal hemorrhage unresponsive to volume replacement, vascular wounds with limb ischemia, incomplete amputations, and central nervous system (CNS) wounds with deteriorating neurological status.
- b. Delayed Category (yellow) applies to casualties who can tolerate delay prior to operative intervention. Some examples are stable abdominal wounds with probable visceral injury, soft tissue wounds requiring debridement, maxillofacial wounds without airway compromise, vascular injuries with adequate collateral circulation, genitourinary tract disruption, fractures requiring operative manipulation debridement and external fixation, and most eye and CNS injuries.
- c. Minimal Category (green) applies to casualties with superficial wounds that require cleansing, minimal debridement, tetanus toxoid, and first aid and dressing. Some examples are burns of less than 15% upper extremity fractures, sprains, and abrasions.
- d. Expectant Category (black) applies to casualties whose injuries are so extensive that, even with optimal medical resource application, their survival still would be very unlikely. For example, unresponsive patients with penetrating head wounds, high spinal cord injuries, mutilating explosive wounds involving multiple anatomical sites and organs, second- and third-degree burns in excess of 60% total body surface area, and profound shock with multiple injuries.

This is the procedure for classification. It is not complicated. Even the nonmedical person can carry out this process at the site of the incident. As stated by Dr. Mosleh, “there are certain responsibilities for the medical team that arrive at the site of the incident, responsibilities for the paramedics, and plans for the medical team at the hospital. Making treatment available to save lives is very important, to avoid additional casualties.”

The triage officer should establish the treatment area on high ground, upwind, covered and lighted; it should be a safe distance from the incident, and clearly marked. The emergency personnel should remove patients from the triage sector to the treatment sector in order of their medical priority. The treatment sector has some key concepts to remember:

- a. A small number of casualties will require prompt intervention, whereas the majority of wounded will tolerate varying degrees of delay.
- b. The treatment sector cannot waste time with multiple life-threatening wounds.
- c. The most gravely injured are first to be evacuated.
- d. Simple lifesaving procedures should be given the highest priority.
- e. Life takes precedence over limb.

The overall team leaders in the MCI sectors need to ensure measures are implemented to reduce stress on themselves and others. A disaster is a tense and stressful event and requires measures to reduce stress. Some simple ways to relief stress are to rest at regular intervals, effectively rotate rest periods, fully explain each team's responsibilities, assign tasks appropriate for the skill and experience of the responders, provide plenty of food and beverages, and encourage talking, which helps relieve stress.

I thank you very much for your kind attention.



CHAPTER VII

BREAKOUT WORKSHOPS REPORTS AND RECOMMENDATIONS

Introduction

The initial Arabian Gulf Environmental Security Conference conducted in Muscat, Oman in April 2000 identified major concerns and actions perceived as likely to impact military activities in the Arabian Gulf region. Using these identified concerns as focus points, it was the goal of this Armed Forces of Qatar-hosted Environmental Security conference to design a framework for a regional approach to environmental disaster prevention and response and put in place a long-term, sustainable process for achieving a regional capability.

To accomplish this task the conference employed a series of moderated panels that addressed the following areas:

- Prior work in the gulf region on Environmental Security
- Potential risk scenarios for the gulf
- Regional monitoring, warning and information exchange
- Interagency and multilateral approaches to security cooperation on environmental issues

Armed with the valuable information provided by these panels, five workshops were convened to identify the specific actions required to implement the six recommendations that came out of the April 2000 conference, and, using the expertise in attendance, to look in detail at managing the health and disease consequences of intentional and accidental environmental events.

Workshop 1, “Defining Environmental Security And Setting Regional Approach Objectives” was developed to address the recommendation from the Oman conference for “the need to arrive at consensus on a

unified definition of the concept of Environmental Security and its relevant aspects in order to avoid any misunderstanding in the future.”

The need to identify GCC organizational mechanisms to provide required Environmental Security information was the focus of Workshop 2: Environmental Security Intelligence/Detection/Information Sharing.

Workshop 3 addressed the Oman conference’s recommendation to “Establish A Regional Monitoring And Warning Center To Notify The National Centers In Order To Help Coordinate Relief Efforts.”

Environmental events that may require a military response or military support fit into the growing area of “non-traditional” operations. While many skills learned in traditional military individual and unit-level training are applicable to these “new” missions, there are also specialized skills involved that require additional training. Workshop 4 looked at the “Development Of A Process To Achieve Regional Training And Exercises In Prevention And Response.”

The nature of both man-made and naturally occurring health and disease crises is that they do not “respect” national borders. National and regional security can be significantly affected by consequences of intentional or accidental health crises. Workgroup 5 focused on “Identifying Multilateral Processes To Address The Health And Disease Consequences Of Intentional And Accidental Environmental Events.”

The Executive Committee, the keystone workshop, had the responsibility for developing a process to review these recommendations, integrate them and present them to their respective governments for concept approval.

Work Group Presentations

Professor Bernard F. Griffard, Center for Strategic Leadership, U.S. Army War College, chaired this session. Each group representative presented the results of his workgroup deliberation.

I. Defining Environmental Security and Setting Regional Objectives

The goal was to secure, preserve, protect and restore the environment consisting of the air, land, water, people, and biodiversity.

The objectives were to ensure a healthy and productive environment by minimizing the adverse effects of human activities mitigating the effects of environmental change on the well-being of individuals and society, preventing and mitigating natural and man-made disasters, and building or enhancing institutions at the regional level to better define and coordinate the roles of the military and civilian agencies to respond to environmental threats and incidents. The workshop also looked at maintaining a high level of Environmental Security awareness/training/education, and the prevention of environmental issues from generating conflict and war.

Noting that there was not a single definition provided for “Environmental Security” which met the needs of all parties, the group developed a working definition of Environmental Security as, “an integrated proactive approach that ensures the protection, preservation, and restoration of the environment, including air, land, water, biodiversity, natural resources, and people, from natural and man-made disaster that might contribute to instability and conflict.”

Recommendations

The workgroup developed the following recommendations:

- a. Continue to implement the recommendations from Oman 2000 ESC.
- b. Encourage broad participation from civilian ministries and non-governmental agencies in ES initiatives.

- c. Use the ES Committee of GCC as the focal point for coordinating regional approaches to ES.
- d. Establish a Regional Coordination Center.
- e. Define ES threats at the regional level and develop and exercise contingency plans.
- f. Maintain continuity and build capacity/expertise by keeping core ES attendees.
- g. Hold 3rd Conference on Environmental Security within 1-2 years.
- h. Convene GCC-US working group to set objectives and agenda of conference.

Discussion

The participants emphasized there is not a single definition for “Environmental Security.” The United Nations definition of Environmental Security differs from the U.S. Department of Energy’s definition. They agreed the working definition must include: protection of land, sea, and people; saving natural resources; preventing pollution of land, sea, and water; restoration of the resource, and cover both natural and man-made disasters. A participant noted, “so far there is no one ES definition. Why do we need one?” A definition is needed to identify objectives, provide focus, and the process, otherwise this leads to unguided efforts.

The primary concern is to provide a healthy environment for the people living in the region. An effective Environmental Security program improves quality of life through the enactment of legislation limiting industrial emissions, contamination, and enforcing environmental protection compliance.

The participants concluded that Environmental Security issues should be included in both existing and new GCC exercises to develop and refine contingency plans. National exercises should identify the environmental threats at the regional level and result in the development of contingency plans that focus on regional response options. The objective of both national and regional exercises should be to develop standardized procedures for response to an Environmental Security issue.

Environmental Security planning, prevention, and response involves military, civilian, government, and non-government agencies. Due to the close proximity of all Arabian Gulf nations, it is highly probable a natural or man-made disaster will affect all countries.

Disaster response is an interagency effort, not a singular military responsibility. Non-military sources have unique technical expertise required in the planning and response phases that complements the military's abundant supply of equipment and manpower. The involvement of all agencies in the planning process ensures the response is timely, a necessary prerequisite in mitigating the overall impact of the disaster. Most countries have military and civilian agreements but few involve formal coordination with adjacent countries.

The group decided its most important recommendation was the requirement to establish a regional coordination center. The Regional Coordination Center (RCC) provides a clearing house to facilitate the sharing of critical information throughout the region. The RCC provides a mechanism for the countries to respond adequately to an event. Focusing on regional planning, prevention, and response, the RCC provides the coordination for an event within one country that requires international response due to saturation of its organic capability. Such a center to coordinate and synchronize disaster response assets does not currently exist within the GCC.

A main concern was the use of current national coordination centers. What processes and protocols are necessary to tie national assets into an RCC? The RCC through the national centers would coordinate the response to a disaster. National centers are essential in that all countries will not or may not agree to focus on the regional level due to legislative restrictions.

The follow-on sessions and meetings need to focus on the organization, manning, and location of the RCC if approved by the individual countries.

The participants recommended using the GCC Environmental Security Committee, established three years earlier, as the focal point for coordinating regional approaches to ES. Since the GCC's approval is needed to ensure the recommendations are implemented, the GCC ESC

is a key player. The recommendations from the Oman Conference were not approved at the GCC therefore the recommendations were not acted upon and funded.

The third Environmental Security Conference, conducted in the next one to two years, should build upon this conference and include scenarios to move from conceptual to practical exercise. The group recommended using a Bushwehr reactor accident scenario or a scenario from EXERCISE EAGLE RESOLVE. During the next conference, a small group from this working group would attend to provide the background for the GCC, military, and civilian organizations.

II. Environmental Security Intelligence, Detection, and Information Sharing

The goal was to reach a consensus on Environmental Security requirements, and to identify GCC organizational mechanisms to provided the required information

The workgroup objectives included the identification of specific requirements for detection, and information sharing within the GCC, the identification of the means for collecting, processing, and disseminating this information, and the identification of the multiple agencies that require this information.

The workshop developed the following recommendations:

- a. Establish a GCC Environmental Center for sharing operational and data-type information.
- b. GCC Countries Conduct Studies to Prioritize Environmental Threats.
- c. Establish a Network Between Countries to Share Information.
- d. Conduct Regional Joint Environmental Exercises, Participants to include; military, civilian, and industry experts.

Discussion

The establishment of a GCC Environmental Center is needed for sharing operational, data, and capabilities for each country. The Center

would verify and provide timely information, to all regional countries and release information to other countries on a need-to-know basis. It would be a centralized source for data and analysis, and would develop a standardized information-sharing format. As the clearing house for out of region environmental intelligence support, it would manage a resource database containing information on regional disaster response equipment and personnel assets.

The Center would collect, process and distribute information over a computer network accessible through the internet database.

Initial action must be taken to achieve the necessary consensus and identify existing and required organizational mechanisms for sharing information. GCC countries must conduct studies to refine and prioritize environmental threats and then establish the required network between nations to share this vital information.

III. Regional Center/Command and Control Center

The goal was to develop recommendations to establish a regional center and procedures for preventing and responding to Environmental Security issues.

The workshop discussed the various alternatives available for developing a GCC Environmental Security Center, and the doctrinal issues related to identifying the best methods of preventing and responding to environmental crises. It also attempted to select the most technically and politically feasible alternatives and identified the next steps in making the Center and associated doctrine a reality.

The workshop developed the following recommendations:

- a. Establish a regional interagency response coordination center for preventing and responding to natural and man-made disasters.
- b. Empower the center to create contingency plans and procedures and conduct risk assessments and emergency action drills.
- c. Create a permanent facility with partial staffing by interagency delegations from each country with a rotating Chair.

d. Obtain approval of funding for establishment of the regional center at the 2003 GCC Summit.

The Way Ahead

a. Phase 1 – (3 months) Get GCC Secretariat approval for establishment of steering committees to identify existing resources (requires transparency), establish responsibilities (monitoring capability, data collection, risk assessment), and establish interface between countries. Steering committee report due March 2003.

b. Phase 2 – (6 months) Determine needed capabilities and infrastructure and establish procedures. Develop recommendation of organizational structure and training plan. Report due September 2003.

c. Phase 3 – (2 months) Development and submission of budget proposal to GCC Secretariat at GCC Summit 2003.

Discussion

A participant stated, “environmental disasters in such a compact region as the Arabian Gulf impact more than one nation.” The participants agreed the GCC countries alone could not provide all the resources to one or more emergencies at a time. A natural or man-made disaster, such as oil spills and toxic waste would cross national boundaries and a coordination center makes sense to provide a regional response to the event.

A Regional Coordination Center should direct the resources and provide the coordination between countries to mitigate the effects. There are so many accidents from oil tanker spills that there already exists a regional organization for marine emergencies, MEMAC. Due to legal and domestic issues, the individual companies and countries operate independently. A regional center would prepare and exercise contingency plans, authority to release support to other countries, and conduct drills to identify shortfalls.

Currently, there are no regional agreements for the movement of assets from two or three outside countries to respond to a disaster or event in another country. The center could facilitate movement. The center does not command and control, but coordinates the response. The upsides

would extend the benefits of help. Using the September 11 New York City response as an example, the State of New York was always in charge and FEMA coordinated outside assistance and it gave the governor one point of contact.

The participants suggested forming a steering group to determine the organization and functions of the Regional Coordination Center. The steering group would develop the Center's purpose, functions, and roles. The Center's major role is the interface and coordination between military and civilian organizations. The group would develop a database of existing resources within each country and augment existing resources and develop thresholds for response when an emergency is beyond a country's ability to respond. A common set of standards and communication channels between the countries would also be required. Review the structure of the national command centers to ensure they can communicate with the regional center. Currently, countries have different systems that inhibit facilitation. Lastly, the group would determine the level of authority the regional center would possess. In the United States, the Federal Emergency Management Agency (FEMA) has no authority, but the capability to identify, request, and provide additional support to include military assets.

There was disagreement on whether to construct a regional center or use an existing national center to perform the regional functions on a rotating basis. Each country has a national operations center that can be connected together with a regional center. One point of agreement was that regional centers never work if established only in an emergency. The regional center must be permanent. The personnel in the center would consist of military and civilian experts. The civilian and industry sectors have the technical expertise the military does not possess.

The countries need to obtain the GCC's approval and support for the development of the regional coordination center. The GCC provides the authority and official recognition for the center to perform its mission dependent on buy in of all countries. The need for a regional center should be added to the next GCC conference agenda.

IV. Regional Training and Exercises

The goal was to identify the requirement for training and exercises in the prevention of and response to Environmental Security related events and crisis.

The workshop sought to identify requirements for training and exercises, develop initial concepts for training and exercises at the National and Regional levels, and identify the next steps required to develop a detailed planning process

The workshop recommendations included:

- a. Refine a list of threats.
- b. Hold GCC contingency planning training.
- c. Identify existing contingency and exercise plans.
- d. Develop compatible interagency national plans; include NGOs, private organizations, and international organizations.
- e. Develop GCC regional plans.
- f. Identify existing capabilities, training and exercises.
- g. Based on plans, identify additional resources, training and exercises required in the GCC.
- h. Develop a notional timeline for the above activities.

In order to achieve the goal and objectives, there are challenges to developing, regional training exercises. The first step is to have a solid plan to train and exercise. There is no regional plan upon which to develop a solid exercise program. The plan must include military, government, and civilian sectors (private and industry). Each GCC country has conducted internal or bi-lateral exercises for responding to different threats in the area. There is no regional exercise to conduct environmental disaster response.

In this light the workshop identified threats crucial to the security of the environment in the region. The current threat may be the oil spill, chemical weapon of mass destruction, environmental terrorism, or water

shortage depending on your situation. In order to prepare a good plan for training, the GCC should train and equip its responders to face the potential types of threat.

Environmental events that may require a military response or military support fit into the growing area of “nontraditional” operations. While many skills learned in traditional military individual and unit-level training are applicable to these “new” missions, there are also specialized skills involved that require additional training. To meet these requirements the GCC must develop regional Environmental Security contingency plans. With such plans in place it will be possible to identify existing capabilities and shortfalls, and then to program the additional resources, training and exercises required.

V. Managing Health and Disease Consequences

The goal was to identify multilateral processes to address the health and disease consequences of intentional and accidental environmental events.

The workshop reviewed the lessons learned from the anthrax and West Nile virus issues, particularly in the context of environmental management in the Arabian Gulf Region, identified civilian and military First Responders issues, priorities, and training initiatives, along with the opportunities for interagency and multilateral partnerships and information sharing.

The workshop recommendations included:

- a. Conduct a focus workshop to be held in Spring 2003 in Jordan. This workshop will promote multilateral information exchanges, and the reinforcement of the existing network of experts.
- b. Address the areas of incidents that span beyond the scope of just localized events to those that are transnational, and make recommendations in the area of policy and improved opportunities, prevention and prediction.
- c. Expand on the civil-military ties and actually develop a virtual network of experts that can be used in a reach-back scenario, in a crisis, and to mitigate the outcome and to leverage existing training exercises and

opportunities, not only to exercise skill sets specific to this area, but also to validate our concepts in a real world environment.

Discussion

The workgroup analyzed specific cases of the West Nile outbreaks, of the anthrax cases that we have recently dealt with and learned from, and tried to project our understanding into potential events within the Gulf region.

The group identified first responder issues, with a specific interest in military, civilian and partnering with the private sector, and specifically identifying opportunities that may exist for interagency and multilateral opportunities.

The U.S. Central Command provided a generalized understanding of its Cooperative Defense Initiative (CDI), and where we could fit our activities into the existing process.

The representatives described the various mechanisms for tracking infectious diseases in their countries. Going beyond the planning processes that already exist, to understand differences and cultural interests that reflected thresholds for reporting commonalities and shortfalls in this process.

The delegates are interested in developing a country-specific and a region specific database and leveraging what already exists in the community for tracking infectious diseases.

The potential use of weapons of mass destruction (WMD), primarily dual-use pathogens led a discussion focusing beyond the traditional understanding of chemical, biological, and toxicological industrial accidents, but to the understanding the very complex area of weapons of mass destruction and effects which may exist, and specifically in the area of dual-use pathogens and emerging diseases. This is of great interest to us all, because it is of global significance.

Lastly, the group looked for opportunities in which new interfaces may exist, or older interfaces may be expanded, in the military, civilian, and private sectors. Workgroup members concurred with the comprehensive

span of threats that may exist, and specifically looked through the lens of medical implications and opportunities in which these implications could be used for prevention and prediction of an event, to the standpoint that we could actually use our knowledge base and network of experts to expand operational capability.

VI. Executive Committee: The Next Steps and Way Ahead

The goal was to develop recommendations to the Gulf Cooperation Council (GCC) Armed Forces and United States Central Command for methods to enhance Environmental Security planning, prevention, and disaster response in the Arabian Gulf. The objectives of the Executive Committee (EXCOM) were to agree on a process for addressing the conference recommendations and establish a timeline and schedule follow-on activities.

The group consensus was that the Executive Committee needed to meet periodically to determine the focus of the upcoming conferences, work group issues, and the conduct of follow-on workshops. In addition, the EXCOM would determine the mission, function, responsibilities, etc. of the coordination center so we can brief our government officials at home.

The EXCOM recommended meeting in 3-4 months to consider the following:

- a. Civil authorities that play a role, interaction during a response.
- b. Recommendations to decision makers to review and approve and determine roles and missions of the center for response and training.
- c. The concept of locating the Center in Qatar, which would not be a problem if no other country were willing to establish the center in their country.
- d. The concept for an ideal center, which would be a joint center consisting of interagency staff from crisis management, ES, civilian, and military authorities.
- e. The Qatar Armed Forces plan that would establish a unit that addresses issues concerning the environment.

Discussion

Gulf Cooperation Council. The Gulf Cooperation Council (GCC) provides the overarching regional focus for the Arabian Gulf States. The Executive Committee (EXCOM) needs to present its recommendations to the GCC Military Council to gain official approval. There were no tangible results and actions from the Oman Conference since the GCC did not provide official approval. The EXCOM needs to coordinate and involve the GCC ministries and agencies in planning and conducting training. The GCC can provide training assets, coordination, equipment, and funding to conduct training to improve coordination. The EXCOM can present its proposals and recommendations at their regularly scheduled meetings.

Increase Interagency Cooperation Between Military and Civilian Agencies. Environmental Crisis planning and response must include military, civilian, government, and NGO organizations to ensure cooperation between these groups prior to a crisis. Their involvement in the planning process is essential.

Each country has civilian agencies, government ministries, and enacted legislation to cooperate during a disaster and does well on disaster response because the agencies involved know the processes. However, the challenge to assist another country and the ability to respond quickly loses synergy if the focus is within our country. The region needs processes, plans, coordination exercises, and training prior to a disaster, if not, then the response will not occur rapidly and will be hampered because we must depend on other ministries to assist in the coordination and liaison.

The military has specialized equipment that makes it unique for assisting during a disaster. The Armed Forces play a large role in disaster response but the countries need to recommend and develop actions to improve the standards and quality of training and equipment.

Each country already conducts training exercises. However, training programs and exercises are needed to increase cooperation and coordination between military and civilian agencies is needed to ensure cooperation. The countries need to identify existing training exercises without adding exercises to an already full calendar. Each of the countries can add

Environmental Security issues to existing training exercises at a low cost without adding new exercises. Lastly, each country needs to have similar training programs, plans, and equipment to facilitate disaster response efforts.

Effectively Activate the Armed Forces of the GCC Environmental Committee resulting from Oman Conference. As stated earlier, the military has specialized equipment that makes it unique for assisting during a disaster and the Armed Forces play a large role in disaster. There is a need for programs that raise Environmental Security awareness within the Armed Forces. These programs must address the role of the armed forces in cooperation with civilian authorities.

The region needs to conduct training exercises on Environmental Security. The United States has the ability to train and educate the GCC on crisis response. The GCC must support and provide assistance during the training. CENTCOM can provide expertise on the level of response and equipment required for various types and levels of disaster.

Establish Regional Environmental Coordination Center. The EXCOM recommended the establishment of a regional environmental coordination center. Currently, the region lacks an effective fully manned and regional coordination center, including both military and civilian representatives, from each GCC country with Iran and Iraq. In addition, the establishment of a regional center supports an Operation EAGLE RESOLVE recommendation for a regional operations center to provide a link between national and regional consequence management activities.

A regional coordination center is needed to protect the environment, provide early warning, facilitate coordination across national boundaries, and provides specialized assistance and expertise in response to natural and man-made disasters. The Coordination Center must be active in preventing, planning, and educating for disaster response not just responding.

The Center can conduct studies to increase cooperation and provide education programs at all levels to protect the environment. A regional center provides a mechanism to coordinate activities and a means to facilitate information exchange to coordinate the regions efforts. The

center would provide the platform to develop public education courses in schools, communities, and use of the media to mitigate the affects of a man-made or natural disaster. The Center's focus would be on those areas affecting two or more countries, such as oil spills and dual use pathogens.

A start point for a regional center is the need for each country to inventory its capacity, military and civilian, and disaster/civil defense plans. This information is required to ensure the proper cooperation and response during a crisis (joint and multilateral). Implement processes to assist other countries. This will determine what the regional coordination center will look like.

Lastly, the location of the center would not be finalized without approval from the countries.

CHAPTER VIII

CLOSING REMARKS

Closing remarks were made by General Tommy R. Franks, United States Army, Commander, United States Central Command; Ambassador Maureen E. Quinn, United States Ambassador to Qatar; and Major General Hamad bin Ali Al-Attia, Chief of Staff, Qatar Armed Forces. The remarks follow in the order of their presentation.

Closing Remarks of Commander, United States Central Command

General Tommy R. Franks, United States Army
Commander, United States Central Command

Thank you very much. General Al-Attia, Excellencies, distinguished guests, ladies and gentlemen, it is an honor to be here for our second environmental conference. A lot of work has been done, and I think much work remains. I feel as though we are all in the debt of Miss Alina Romanowski for the work that she and her team have done to bring this about. We say thanks to you and your team for your efforts. You have been quite professional. For our own Secretary of Defense, we are honored to have you here, thank you very much for being with us as well. For the delegates of the GCC and Jordan, we are honored that you have seen fit, and that your governments have seen fit to have you participate in this conference. It is important to all of us.

When we think about the things that can happen to us, man-made or natural, it seems to me that one of the purposes of our governments is to provide for the well-being of the citizens from each of the states represented here, in this region. What better way to do that, than to have all of us come together. It seems to me that we need to do this frequently, once a year or every two years, to think about the sorts of problems we might have with the environment in the future, and to think about how we can share information in order to be able to address those disasters. We also need to

discuss at some point how we can share capacity, and how the nations in this region can share their capability to assist the citizens of perhaps other states in the region to be able to overcome environmental issues.

Going back several years, I remember a discussion I had with General Tony Zinni, my predecessor in this job. I asked him what he saw as the principal threats in the region, and what he saw as the things United States Central Command should be working with states of the GCC to think about and at some point hopefully to help resolve. It would surprise no one in this room that General Zinni looked at me and he said, "Well, one of the things that we are going to have to continue to worry about is terrorism." And I think it would come as no surprise to anyone in this audience that a second point General Zinni made was: "We are going to have to continue to watch Weapons of Mass Destruction, and the proliferation of those weapons." I will not go through the rest of the things that were on that list. But I will say that prominent on that list was environmental considerations.

It seems to me that some good progress has been made because we have gotten to know one another in this room. We have some appreciation of the capacity to handle environmental disasters, in this room. We have agreed to meet to try to determine a way ahead to make us more competent and better at handling environmental problems. All of that seems to me to be big progress. I have been very impressed with what I have seen here this afternoon. It has marked and laid out a potential way ahead for us to move toward in making our capability to both understand, and perhaps predict how to certainly respond to environmental issues as they come up. The list of potential environmental issues as it has been described this afternoon, is a long list. It seems to me that we are off on the right foot, to be able to move forward.

Now how we move forward and how we use the Executive Committee two to three times over the next year-to-eighteen-months, needs to be figured out. We need to determine if we want to establish a Regional Coordination Center, where we can have full-time people, perhaps with a rotating chair, to be able to manage and think about environmental issues in the years ahead. That is work that we are going to have to finalize and work that we are going to have to do. The commitment that I will make is that the United States Central Command, our Department

of Defense and my own country will continue to work with you, to move at a pace and in a direction that seems appropriate to this group.

I am honored to be here. I am especially honored that His Highness Sheikh Hamad would permit us to be here and that General Al-Attia would facilitate this environmental conference in such a lovely venue. Sir, it is an honor to be here with you. We are in your debt. We thank you very much. Much has been gained, and we look forward to continuing this process.

Closing Remarks of the Ambassador of the United States to Qatar

Ambassador Maureen E. Quinn
United States Ambassador to Qatar

Good Afternoon. Your Excellency General Al-Attia, General Franks, friends from the Gulf Cooperation Council countries and Jordan and the United States.

I want to start by saying congratulations. General Al-Hinzab, General Ali, Alina Romanowski, Heads of Delegation, I really am impressed with the work that you have done in the past few days. I realize that I probably should not be too surprised, because certainly the experts who have come together over the past few days, the experts in this room, are a treasure for all of us in the Arabian Gulf and in the Arabian Gulf's partnership with the United States.

In some ways it is simple. The air we breathe, the water we drink, the land we live on are the precious resources of this generation and the generation to come. As mentioned in the closing presentations today, people too are key to Environmental Security.

Assistant Deputy Under Secretary Bowling challenged you at the opening of the conference to allow these workshops and sessions to lead to cooperative action. I want to underline action.

Under Secretary Bowling called for:

- Shared regional objectives
- Indicators and warnings

- **Regional command and control**
- **Training and exercises**
- **Multilateral ways to address and fight disease, and finally**
- **Building a framework for a regional approach**

Listening to your summaries, that is what I have heard. Congratulations on your success in meeting his challenge.

Still regional cooperation is more easily said than done. Your efforts to work together on a framework for action will take time. You have committed yourselves. As you go forward, there will probably be a lot of process. Process is not always fun. Yet we recognize that there is a value in the substance of your discussion and in the process of your getting together regularly.

What makes the process work and the substance so valuable is Omanis, Saudis, Emirates, Kuwaitis, Jordanians, Qataris, and Americans planning joint activities, future contacts and cooperative efforts.

Congratulations on your accomplishments, and we look forward to much, much more.

Closing Remarks of the Chief of Staff of the Qatar Armed Forces

Major General Hamad bin Ali Al-Attia
Chief of Staff, Qatar Armed Forces

In the name of God, the Merciful, the Beneficent.

General Franks, I would like to welcome you here and thank you for your presence, which is an indication that you and United States Central Command are very interested in this conference.

Your Excellencies, the leaders, ladies and gentlemen, dear guests, we are now close to the end of our conference, which has lasted three days, during which we have explored several points of view, and exchanged information, facts, and expertise among the participants and experts.

Six working groups were formed during this conference. Each one of these groups discussed a specific topic. Some of these topics relate to the future in the 21st century and the way to manage the environment and protect it; others dealt with training and joint exercises, and another group discussed establishing a command and control center and the exchange of information. I would like to thank you for your serious contribution to this conference, which indicates your sincere interest in the best methods for environmental protection. We listened to the results of these working groups, and we noted the recommendations that are evidence of your interest.

Brothers and sisters, the responsibility for protecting the environment is not limited to one group or one authority, but is the responsibility of all individuals in every society. We are all required to make the extra effort, to find the most suitable method, to adopt the rules and regulations that help make this task easier. Finding these methods will come only through working, holding seminars and conferences, and exchanging expertise. This expertise should then be developed practically by establishing joint centers that take care of the environment. Your opinions, as expressed by the recommendations of this conference, deserve the greatest attention from us. We need to take them seriously and seek to implement them.

Dear guests, we were happy to have you in your second country, and we hope we were able to facilitate your task during this conference. We look forward to seeing you on other occasions in your second country, Qatar. I would like to sincerely thank you for accepting our invitation and attending this conference. Thank you as well for your active contribution to the success of this conference.

I would like to give a special thanks to our friends at the United States Central Command, the National Defense University, represented by the Near East-South Asia Center for Strategic Studies, and the United States Army War College for their active participation in the preparation, planning, and management of this conference, in cooperation with the officers and individuals from the Qatari Armed Forces. Also, I would like to thank our brothers from the GCC countries for their presence and support of this conference. I will not forget thanking all the participating brothers from all the ministries, establishments, and governmental and non-governmental

administrations in the state of Qatar. I would like to make a special mention of the active and distinguished female participation in this conference.

Your Excellencies, the leaders, and our dear guests, finally I have but to pray to God to bless you all for the good and benefit of your countries and make you successful.

“Say ‘Toil, that God may witness your toil, and his Prophet, and the believers’.” [Qur’an]

APPENDIX A

ATTENDEE LIST

State of Bahrain

Colonel (Dr.) Salman Al-Khalifa

Head of Delegation
Assistant Commander
Bahrain Defense Forces Hospital

Mr. Awni M. Al-Masri

Regional Environmental Engineer

Lieutenant Colonel Salah Jassem Al-Omir

Staff Officer
Royal Bahrain Naval Forces

Captain Osama Hussein Ali

Nuclear, Biological, and Chemical
Unit
Bahrain Defense Forces

Lieutenant Colonel (Dr.) Khalil Abdulwahid Hussein

Commander
Bahrain Defense Forces Medical Unit

Lieutenant Colonel Adnan Ahmed Mubarak

Staff Officer
Bahrain Defense Forces

Federative Republic of Brazil

Dr. Thomaz G. Costa

Professor of National Security Affairs
Center for Hemispheric Defense Studies,
National Defense University

Arab Republic of Egypt

Ms. Suzan Abulfarag

Interpreter

Mr. Samah Iskander

Interpreter

Mr. Nevine Youssef

Interpreter

Republic of Finland

Mr. Pekka Haavisto

Chairman, Afghanistan Task Force
United Nations Environment Program
(UNEP)
Post Conflict Assessment Unit

Gulf Cooperation Council

Major General Ali bin Salman Al-Mamari

Assistant Secretary General for
Military Affairs

Major Mohammed bin Abdullah Al-Shaidi

Delegate

Brigadier General Mirdass Ahmed Al-Sudairi

Delegate

Hashemite Kingdom of Jordan

**Brigadier General (Dr.)
Mohammed Al-Abbadi**

Director, Field Medicine
Royal Medical Service

Ms. Vera Nofal

Interpreter

Kingdom of Saudi Arabia

**Captain Abdulrahman bin
Suleiman Al-A'qil**

Delegate

Major Ahmed bin Omar Al-Sabeel

Delegate

Major Hamed bin Nasser Al-Talian

Delegate

Dr. Ali bin Adulkarim Al-Thwaini

Head of Delegation

**Dr. Suleiman bin Mohammed Al-
Zaben**

Delegate

State of Kuwait

**Lieutenant Colonel Mordhi Saiqur
Al-Anzi**

Delegate

**Colonel Mohamed Youssef Shams
Al-Din**

Head of Delegation

Colonel Ahmed Al-Khobaizi

Delegate

**Major Ahmed Abdullah Al-
Marshad**

Delegate

**Lieutenant Colonel Mansour
Khaled Al-Masa'd**

Delegate

**Captain Manawar Salah Al-
Mateeri**

Delegate

**Lieutenant Colonel Salah Ahmed
Al-Samait**

Delegate

**Colonel Ahmed Adulrahman Al-
Tawil**

Delegate

Major Khalid Salem Khalifa

Delegate

Sultanate of Oman

**Major Mohammed bin Suleiman
bin Salim Al-Hatali**

Delegate

**Lieutenant Colonel Nabil bin Salem
Al-Ma'eni**

Delegate

**Mr. Hameed bin Ali Omir Al-
Roqami**

Delegate

**Colonel Nasser bin Salem bin
Nasser Al-Tamtami**

Head of Delegation

**Lieutenant Colonel Mohammed bin
Hameed bin Said
Al-Thahli**

Delegate

State of Qatar

Mr. Abdulla Ahmed Al-Abdulla

Delegate

Mr. Khaled Ghanem Al-Ali

Secretary General for the
Environment

Supreme Council of Environment and
Natural Preservation

**Brigadier General Nasser
Mohammed Al-Ali**

Head of Delegation
Special Assistant to the Chief of Staff
Qatar Armed Forces

**MAJ Abdulla Abdulqader Al-
Amari**

Delegate

Mr. Tariq Al-Ansari

Qatar General Electricity and Water Corporation

Major General Hamad bin Ali Al-Attia

Chief of Staff
Qatar Armed Forces

Doctor Abdulrahman Ali Al-Buaineen

Delegate

Captain Hassan Mohammed Al-Emadi

Delegate

Dr. Abdullah Al-Hamad

Ministry of Municipalities

Brigadier General Hamad Ali Al-Hinzab

Special Assistant to the Chief of Staff
Qatar Armed Forces

Mr. Mubarak Abdulla Al-Kholaifi

Delegate

His Excellency Abdulrahman bin Hamad Al-Attiah

Secretary General, Gulf Cooperation Council

Mr. Khalid Mohammed Al-Bakr

Delegate

Major Abdulla Al-Buaineen

Delegate

Dr. Khalid Rashid Al-Hairi

Delegate

Mr. Abdulla bin Ali Al-Hanzab

Ministry of the Interior

Lieutenant Colonel Hamad Mohammed Al-Kaabi

Delegate

Brigadier General Saad Jassem Al-Kholaifi

Director
Criminal Laboratory Department
Department of Police

Mr. Hamad bin Youssef Al-Mahmoud

Ministry of Foreign Affairs

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Lieutenant Colonel Mohammed Ibrahim Al-Mohanadi

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Mr. Khalid Al-Mulla

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Qatar Petroleum Company

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Department of Police

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Delegate

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Al-Thani**

Delegate

**Sheikh Khalid bin Khalifa
Al-Thani**

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Lieutenant Hussein Ali

Protocol

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Delegate

Mr. Sadeq Khloom Farag

Delegate

Dr. Abdullah Omar Hamaq

Delegate

First Lieutenant Abdul Hussain

Delegate

Mr. Abdulla Hussain Jaber

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Kandilli Observatory and Earthquake Research
Institute – Boğaziçi University Istanbul, Turkey

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Mubarak Yaquod Al-Ghaffi**

Delegate

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Ismail Hashem Al-Housani**

Delegate

**Brigadier General Ali Mohammed
Sabeeh Al-Kaabi**

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**Major Ali Said Rashid
Al-Maqbali**

Delegate

**Major Hamden Rashed Hameed
Al-Noaimi**

Delegate

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Abdulrahman Mohammed Al-Saidi**

Delegate

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J-3
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Ambassador
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5)
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Non-commissioned Officer
United States Central Command

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Delegate

Lieutenant Colonel Gregory J. Wick

Delegate
Chief, Middle East/Africa Branch
Army Regional Policy and Politico-
Military Affairs Division
Headquarters, Department of the
Army

Major Joseph G. Williamson

Command Veterinarian
United States Army Central
Command

APPENDIX B

AGENDA

Conference on Environmental Security Planning, Prevention, and Disaster Response in the Arabian Gulf Region

Day 0 (15 September 2002)

2130-2130 **Registration**

1900-2200 **Dinner Hosted by Qatar Armed Forces** (Buses Leave
From VIP Entrance In Front Of Al Wosail Room At 1815
Hours – Guides Posted In Hotel Lobby)

Day 1 (16 September 2002)

0900-1010 **Opening Ceremony**

- *Host Welcome:* MG Hamad bin Ali Al-Attia, Chief of Staff, Qatar Armed Forces
- *USCENTCOM Welcome:* BGen George J. Trautman III, Deputy Director, Plans and Policy, J5, USCENTCOM
- *Setting the Azimuth:* Dr. Kent Hughes Butts, Director, National Security Issues, Center for Strategic Leadership, U.S. Army War College (AWC/CSL)
- *Introduction of Keynote Speaker:* Ms. Alina Romanowski, Director Near East-South Asia Center for Strategic Studies (NESA Center)
- *Keynote Address:* Mr. Curtis Bowling, Assistant Deputy Under Secretary of Defense, Installations & Environment [ADUSD(I&E)]

1010-1030 **BREAK**

- 1200-1200 Session One: Security and the Environment: Regional Approaches (Moderator: Dr. Kent Hughes Butts, Director, National Security Issues, AWC/CSL)**
- *Report on Results of April 2000 Conference:* Colonel Nasser Bin Salem Al-Tamtami, Sultanate of Oman's Armed Forces
 - *Interagency Training for Disaster Response, September 2002 Exercise:* Brig Gen Nasser Mohammed Al-Ali, Special Assistant to the Chief of Staff, Qatar Armed Forces
- 1200-1500 BREAK**
- 1620-1620 Session Two: Potential Risk Scenarios (Moderator: Brig Gen Hamad Ali Al-Hinzab, Qatar Armed Forces)**
- *Petro-Chemical Environmental Concerns:* Mohammed Jassem Al-Muslimani Qatar Ministry of Energy, Director, Safety, Quality and the Environment, Qatar Petroleum Company
 - *Water: Protecting the Supply and Quality in the Gulf:* Abdul Rahman Ali Al-Naama, Water Quality Engineer, Environment, Safety, and Quality Department, Qatar General Electricity and Water Corporation
 - *Health and Disease Response:* Brig Gen Annette L. Sobel, M.D., Assistant to the Chief, National Guard Bureau for WMD and Civilian Support
- 1620-1640 BREAK****1640-1640**

1640-1800 Session Three: Security and Environmental Planning in the 21st Century – Regional Monitoring, Warning & Information Exchange (Moderator: Mr. Trevor Hughes, Rice Hughes L.L.C.)

- *9/11: Multi-level Response & Management:* LTC Randy Lambrecht, Deputy Director, Operations, Training, and Readiness, New York Army National Guard•
- *Remote Sensing and Disaster Support:* Dr. Michael Foose, Regional Specialist for Africa and the Middle East, United States Geological Survey
- *Information Exchange & Management Tools: PIMS & DENIX:* Jackie Hux Cain

Day 2 (17 September 2002)

0900-1020 Session Four: Cooperation Between Defense and Other Agencies (Moderator: RADM (Ret.) John F. Sigler, Near East South Asia Center)

- *Initial Reactions: Coordinating with The First Responders:* BGen Craig T. Boddington, Commander, Joint Task Force – Consequence Management, Kuwait
- *Promoting Stability & Capability – Regional Cooperative Initiatives:* Mr. Paul Malik, Director, DOS Environmental Hub, Jordan
- *Turkish Earthquakes: Response, Lessons Learned, New Procedures and Mechanisms:* Professor Mustafa Erdik, Chairman, Earthquake Engineering Department, Bogazici University
- *Medical Response:* Dr. Abdul Wahab Al-Mosleh, Assistant Medical Director, Hamad Medical Corporation

1020-1040 BREAK

1040-1200

Session Five: Multilateral Approaches To Security Cooperation on Environmental Issues (Moderator: Mr. Curtis Bowling, Assistant Deputy Under Secretary of Defense, Installations & Environment [ADUSD(I&E)])

- *Coordinating Regional Disaster Response Activities:* Mr. Gary Barrett, Office of Foreign Disaster Assistance (OFDA), United States Agency for International Development (USAID)
- *Post-Event Environmental Assessment - United Nations Processes and Mechanisms:* Mr. Pekka Haavisto, Chairman Of The Afghanistan Task Force, United Nations Environment Program
- *Existing Qatari and GCC Organizations/Mechanisms:* Mr. Khalid Al-Ali, Secretary General, Supreme Council of Environment and Natural Preservation for Qatar
- *Multilateral Approaches to Consequence Management – A Medical Perspective:* Brig Gen Mohammed Al-Abbadi, Director of Medicine, Royal Jordanian Air Force

1230-1230

**Breakout Workshops
(Moderator: Professor B.F. Griffard, Center for Strategic Leadership, USAWC)**

- Plenary Session: Objectives and Process

1530-1530

BREAK

1800-1800 Breakout Workshops: Problem Definition

- *Group One: Defining Environmental Security and Setting Regional Approach Objectives* (Facilitator: Ms. Alina Romanowski, Near East-South Asia Center)
- *Group Two: Environmental Security Intelligence / Detection / Information Sharing* (Facilitator: Mr. John Mentz, Pacific Northwest National Laboratory)
- *Group Three: Regional Center / Command and Control* (Facilitator: Prof. B.F. Griffard, AWC/CSL)
- *Group Four: Regional Training / Exercises* (Facilitator: (RADM (Ret.) John Sigler, NESACenter)

2000-2200 Dinner Hosted by United States Central Command

Day 3 (18 September 2002)

0900-1200 Breakout Workshops: Problem Resolution and Report Preparation

- Group One: Defining Environmental Security and Setting Regional Approach Objectives
- Group Two: Environmental Security Intelligence / Detection / Information Sharing
- Group Three: Regional Center / Command and Control
- Group Four: Regional Training / Exercises

Concurrently: *Executive Committee: The Next Steps and Way Ahead* (Co-Facilitators: Dr. Kent Hughes Butts, AWC/CSL; Brig Gen Hamad Ali Al-Hinzab, Qatar Armed Forces)

1500-1500 BREAK

- 1700-1700 Breakout Workshops: Reports / Recommendations
(Moderator: Professor B.F. Griffard, AWC/CSL)**
- 1700-1715 Executive Committee: Next Steps and the Way Ahead
(Moderator: Dr. Kent Hughes Butts, Center for Strategic
Leadership, USAWC)**
- 1800-1800 Closing Remarks**
- General Tommy R. Franks, Commander, United States Central Command
 - Ambassador Maureen E. Quinn, U.S. Ambassador to Qatar
 - MG Hamad bin Ali Al-Attia, Chief of Staff, Qatar Armed Forces

APPENDIX C

ACRONYMS

ADUSD(I&E)	Assistant Deputy Undersecretary of Defense (Installations and Environment)
AIO	Ambulance Incident Officer
AIREVAC OPS	Air Evacuation Operations
AOR	Area of Responsibility
Apr	April
ARAMCO	Arabian American Oil Company
ATSDR	Agency of Toxic Substances and Disease Registry
Ave	Average
AVHRR	Advanced Very High Resolution Radiometer
BATNEEC	Best Available Technique Not Entailing Excessive Cost
BG	Brigadier General, U.S. Army
BGen	Brigadier General, USMC
BOD	Biochemical Oxygen Demand
Brig Gen	Brigadier General, USAF
CaCO ₃	Calcium Carbonate
CAMRE	Council of Arab Ministers Responsible for the Environment
CARE	Cooperative for Assistance and Relief Everywhere
CB	Cluster Bombs
CBRN	Chemical, Biological, Radiological, and Nuclear

CBRNE	Chemical, Biological, Radiological, Nuclear, and High-Yield Explosive
CCATT/AE	Critical Care Aeromedical Transport Team (USAF)
CDC	Center for Disease Control and Prevention
CDI	Cooperative Defense Initiative
Chem	Chemical
CISM	Crisis Incidents Stress Management
CITES	Convention On International Trade In Endangered Species (of Wild Fauna and Flora)
C/JTF	Combined Joint Task Force
C/JTF-CM	Combined Joint Task Force – Consequence Management
CM	Consequence Management
CMST	Consequence Management Support Team
CNS	Central Nervous System
CO	Company
COD	Chemical Oxygen Demand
CP	Command Post
CSL	Center for Strategic Leadership, United States Army War College
CST	Civil Support Teams
CuM	Cubic Meters
CZ	Czech Republic
D-0	Day Minus Zero
D+1	Day Plus One
D+7	Day Plus Seven
D+X	Day Plus Indefinite Time

DART/GO	Disaster Assistance Response or Ground Operations Teams
D.C.	District of Columbia
DECON	Decontamination
DENIX	Defense Environmental Network and Information Exchange
DMNA	Division of Military and Naval Affairs
DOD	Department of Defense
DOS	Days of Supply
DOS	Department of State
Dr.	Doctor
DU	Depleted Uranium
DUSD (I&E)	Deputy Under Secretary of Defense for Installations and Environment
EDC	Dichloroethane
EIA	Environmental Impact Assessment
EMAC	Emergency Management Assistance Compact
EMEDS	Expeditionary Medical System
EMP	Environment Monitoring Program in Qatar
EMT-P	Emergency Medical Technician – Paramedic
Engr Const Det	Engineer Construction Detachment
EOD	Explosives Ordnance Detachment
EOF	Extended Operating Forces
EPA	Environmental Protection Agency (United States)
ERC	Emergency Response Card
ERP	Emergency Response Plan
ES	Environmental Security
ESC	Environmental Security Conference

ESAMS	Environmental Site Assessment and Management System
ESOH	Environmental, Safety, and Occupational Health
ETHANE	Exact location of the disaster, Type of incident, Hazards, Access to the site, Number of victims, and Emergency Services needed to respond
EUCOM	United States European Command
EXACT	Executive Action Team
EXCOM	Executive Committee
FB	Fiber Bombs
FBI	Federal Bureau of Investigation (United States)
FEMA	Federal Emergency Management Agency (United States)
FEST	Foreign Emergency Support Team
FEWS	Famine Early Warning System
FRY	Federal Republic of Yugoslavia
FWD	Forward
GCC	Gulf Cooperation Council
GDDA	General Directorate of Disaster Affairs
GDP	Gross Domestic Product
GE	Federal Republic of Germany
GIS	Geographic Information Systems
GLOBE	Global Learning and Observations to Benefit the Environment
GAOCMAO	Gulf Area Oil Companies Mutual Aid Organization
HIV/AIDS	Human Immunodeficiency Virus/ Acquired Immune Deficiency Syndrome
HN	Host Nation
HQ	Headquarters

IAEA	International Atomic Energy Agency
ICRC	International Committee of the Red Cross
ICU	Intensive Care Unit
IDP	Internally Displaced Persons
ICARDA	International Center for Agricultural Research in the Dry Areas
INF	Infantry
IO	International Organization
IOPC	International Oil Pollution Compensation Fund
IRF	Initial Response Forces
JFK	John F. Kennedy
JTF	Joint Task Force
KFOR	Kosovo Force
KM	Kilometers
KOERI-BU	Kandilli Observatory and Earthquake Research Institute of Boğaziçi University
LNG	Liquefied Natural Gas
LNO Team	Liaison Team
LOGCAP	Logistics Civil Augmentation Program
LTC	Lieutenant Colonel, U.S. Army
MARCENT	United States Marine Forces Central Command
Max	Maximum
MCI	Mass Casualty Incident, Multiple Casualty Incident
M.D.	Medical Doctor
MEDRC	Middle East Desalination Research Center
MEER	Marmara Earthquake Emergency Reconstruction Project
MEMAC	Marine Emergency Mutual Aid Center

MEPP	Middle East Peace Process
MERC	Middle East Regional Cooperation
MFST	Mobile Surgical Team
Mg	Milligrams
MG	Major General
MI	Medical Incident
MIG	Million in Gallons
ml	Milliliter
MMscfd	Million Standard Cubic Feet per Day
Mr.	Mister
Ms.	Miss
MSDS	Material Safety Data Sheet
N	Nitrogen
NASA	National Aeronautics and Space Administration
NATO	North Atlantic Treaty Organization
NBC	Nuclear, Biological, and Chemical
NDVI	Normalized Difference Vegetation Index
NESA	Near East-South Asia Center for Strategic Studies
NG	National Guard
NGO	Non-Governmental Organization
N-Hour	Notification Hour
NOAA	National Oceanic and Atmospheric Administration
NOC	National Operations Center
NTU	Nephelometric Turbidity Units
NY	New York
OFDA	United States Office of Foreign Disaster Assistance

OEM	Office of Emergency Management
OPS	Operations
OPT	Occupied Palestinian Territories
PAM Teams	Prevention and Aerospace Medicine – Teams
PAO	Public Affairs Officer
PCAU	Post Conflict Assessment Unit
PCB	Poly Chlorinated Biphenyls
PDD	Presidential Decision Directive
PERSGA	Protection of the Environment of the Red Sea and the Gulf of Aden
PFP	Partnership for Peace
pH	Potential of Hydrogen
PIMS	Partnership for Peace Information Management System
PLT	Platoon
PPE	Personnel Protective Equipment
PTDO	Preparation to Deploy Order
QAFCO	Qatar Fertilizer Company
QAPCO	Qatar Petrochemical Company
QP	Qatar Petroleum
QRA	Quality Risk Assessment
RADM	Rear Admiral
RAF	Ras Abu Fontes
RASGAS	Ras Laffan Liquefied Natural Gas Company
R/C	Reinforced Concrete
RECON	Reconnaissance
RECISO	Regional Clean Sea Organization
Ret	Retired

RCC	Regional Command and Control Center
RFF	Request for Forces
ROPME	Regional Organization for the Protection of the Marine Environment
SAR	Search and Rescue
SCENR	The Supreme Council for the Environment and Natural Reserves in Qatar
SCEPC	Civil Emergency Planning Committee
SEMO	State Emergency Management Office
SPEAR	Small Portable Expeditionary Aeromedical Rapid Response Team
TCIP	Turkish Catastrophic Insurance Pool
TDS	Total Dissolved Solids
TEMAD	Turkey Emergency Management General Directorate
TEU	Technical Escort Unit
TF	Task Force
TM	Team
TOC	Tactical Operations Center
TOC	Total Organic Carbon
TUPRAS	Turkish Petroleum Refineries Corporation
UAE	United Arab Emirates
UN	United Nations
UNCC	United Nations Compensation Commission
UNDP	United Nations Development Program
UNEP	United Nations Environment Program

UNESCO	United Nations Educational, Scientific, and Cultural Organization
UNHCR	United Nations High Commissioner for Refugees
UNICEF	United Nations Children's Fund
UNMIK	United Nations Mission in Kosovo
US\$	United States Dollars
μS/cm	MicroSiemens Per Centimeter
U.S.	United States
USAID	United States Agency for International Development
USAWC	United States Army War College
USAWC/CSL	United States Army War College/Center for Strategic Leadership
USCENTCOM	United States Central Command
USG	United States Government
USGS	United States Geological Survey
USD	United States Dollars
USPHS	United States Public Health Service
UXO	Unexploded Ordnance
VIP	Very Important Person
WFP	World Food Program
WHO	World Health Organization
WMD	Weapons of Mass Destruction
WTC	World Trade Center

